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A CLINICAL STUDY OF BILIARY TRACT DISEASE *

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BALTIMORE

This paper is based on a statistical study [1] of all cases with a diagnosis of disease of the biliary tract that have been in the surgical service of the Johns Hopkins Hospital between 1889 and 1924.

This consideration will not include the cases with malignancy of the biliary tract, and those with a clinical diagnosis of disease which was not confirmed by an operation. The cases are divided into three groups: (1) stones in the gallbladder or cystic duct, or both (460 cases); (2) stones in the common duct, regardless of the location of other stones (139 cases), and (3) acute or chronic cholecystitis without the presence of stones (136 cases).

The main interest centers in the ultimate condition of the patients following operation; but the more important points as regards (1) etiology, (2) symptomatology, (3) physical findings, (4) laboratory tests, (5) operation and reoperation, (6) bacteriology and pathology, and (7) course immediately after operation will be considered also. The figures recorded are for the three groups considered collectively, unless stated otherwise.

ETIOLOGY

The ratio of white to colored patients in this series was 32:1, whereas that of white to colored of all the surgical patients admitted was 5:1. There have been more than twice as many males in the surgical service as females, but two thirds of these patients were of the latter sex.

The average age of these patients was 44 years, with the highest percentage of cases in the fifth decade. The average age was slightly younger for the group without stones.

We found that 28 per cent. of these patients had had typhoid fever, the highest percentage being in the group without stones. The interval separating typhoid and admission to this hospital was shortest in this group. The interval in the three groups, considered collectively, was more than five years in 76 per cent. of the cases.

SYMPTOMATOLOGY

The interval separating the first symptom suggestive of disease of the biliary tract and entry to the hospital was usually shortest in the group without stones. Untoward symptoms had been present for more than five years in 21 per cent. of the cases without stones and in 30 per cent. of those with stones, and for less than one year in 50 per cent of the cases without stones and in 39 per cent. of those with stones. The initial symptoms, as described by the patient, are given in Table 1.

Intervals of almost entire freedom from such symptoms were present in 82 per cent. of the group with stones in the gallbladder, in 71 per cent. of the group with stones in the common duct, and in 71 per cent. of those cases without stones.

The individual symptoms that had been present at one time or another are given in Table 2.

Each of these symptoms, with the exception of pain, occurred most frequently in the group with stones in the common duct and least frequently in the group without stones.

The attacks of pain were considered typical of biliary colic in 81 per cent. of all cases; the largest percentage (88) occurred in the group with stones in the common duct, and the smallest (57) in the group without stones. The pain was usually described as occupying part or all of the right upper quadrant. Radiation of pain was present almost twice as frequently in the groups with stones as in the group without them. When radiation of pain occurred, it was to the right shoulder in 40 per cent., to the right back in 34 per cent., to both shoulders in 8 per cent., and to the right shoulder and right side of the back in 10 per cent. of the cases.

There is a positive history of jaundice in 91 per cent. of the cases with stones in the common duct, in 44 per cent. of those with stones in the gallbladder or cystic duct, and in 37 per cent. of the cases without stones. Jaundice was persistent much more frequently in the group with stones in the common duct in the ratio of more than 3:1, and itching of the skin was present in this group, as compared with the other two, in the ratio of 9:1.

PHYSICAL EXAMINATION

Jaundice was present on entry to the hospital in 30 per cent. of the cases in the group with stones in the gallbladder, in 80 per cent. of those with stones in the common duct, and in 24 per cent. of the cases without stones.

The liver was thought to be abnormally enlarged in 22 per cent. of all cases, the highest percentage falling in the group with stones in the common duct. The gallbladder was said to be palpable in 22 per cent. of all cases, the highest percentage (more than 2:1) being in the group with stones in the gallbladder or cystic duct. Tenderness on abdominal palpation was present in 77 per cent. and muscle spasm in 44 per cent. of all cases. Thirty-one per cent. of the patients were in acute pain at the time of examination, the highest percentage falling in the group with stones in the common duct.

* From the Department of Surgery, the Johns Hopkins University and Hospital.

1. Blalock, Alfred: A Statistical Study of Eight Hundred and Eighty-Eight Cases of Biliary Tract Disease, Bull. Johns Hopkins Hosp., to be published.

LABORATORY FINDINGS

The studies on bile in the stools and urine showed abnormal findings much more frequently in the group with stones in the common duct than in the other two, the ratio on stool examination being 9:1, and on urine analyses 4:1. The white blood counts were above 25,000 in only four out of 458 cases in which they were recorded, while less than 11 per cent. were above 15,000. There was an absence of free hydrochloric acid in 23 per cent. of 206 cases in which the results of analyses were recorded. Roentgen-ray reports were positive for stones in only 13 per cent. of ninety-nine cases in which plates were taken.

TABLE 1.—*Initial Symptoms*

	Per Cent.
Pain	69
Indigestion	16
Nausea and vomiting	3
Jaundice	2
Abdominal soreness	2
Eructation of gas	1.5
Chills and fever	1.5
Malaise	1
Various	14

OPERATION

A right rectus incision was employed in almost every case. Free peritoneal fluid was found in 6 per cent. of the cases, and right upper quadrant adhesions were present in 73 per cent. The latter were numerous and dense in 42 per cent., while they were few in number in 31 per cent. Adhesions were usually more numerous and more dense in the group with stones in the common duct.

The liver was described by the operator as being enlarged in 19 per cent. of the cases, and the gallbladder was considered macroscopically abnormal in 80 per cent. By far the highest percentage of normal looking gallbladders was found in the group without stones.

In the group with stones in the gallbladder or cystic duct, stones were found in the cystic duct in 43 per cent. of the cases, but were present in the cystic duct alone in only 6 per cent. of the cases. In the group classified as stones in the common duct, stones were present in the latter except for three cases in which they were in the hepatic duct. In addition, fifteen patients had material described as sand or mud in the common duct. Only one stone was found in 18 per cent. of the cases, between one and ten stones in 43 per cent., and more than ten stones in 39 per cent.

The fluid contents of the biliary tract were abnormal looking in 47 per cent. of the cases, the highest percentage falling in the group with stones in the gallbladder. Cultures taken at time of the operation were positive in 58 per cent. of the cases. The group with stones in the common duct had the highest percentage of positive cultures, while the group without stones had the lowest. *Bacillus coli* was the organism in 49 per cent. and *Bacillus typhosus* in 19 per cent. There was a definite empyema of the gallbladder in 17 per cent. and a hydrops in 9 per cent. of the cases.

Other definite pathologic conditions, in addition to those involving the biliary tract, were found in 25 per cent. of the cases. The appendix was diseased in 109 cases and the pancreas indurated in thirty-six cases. The highest percentage of cases with a diseased appendix was in the group without stones. The various other pathologic lesions will not be enumerated here.

The gallbladder was removed in 366 cases, partially removed in five, and drained in 330 cases. In the cases in which the gallbladder was resected, the cystic artery and duct were ligated either with silk alone, or catgut alone, or both. A choledochostomy was performed in sixty-four cases. The abdomen was closed tightly without drainage in only a few cases. The duodenum was probed through the common duct at the time of operation in all cases in the common duct group except fifteen, in some instances due to neglect, and in others to inability. It is significant that a subsequent operation had to be performed for stones in the common duct in seven of these cases.

MICROSCOPIC PATHOLOGY

Notes were obtainable in 354 of the 366 cases in which the gallbladder was removed. The wall was thickened in 93 per cent. and the mucosa abnormal in 82 per cent. of the cases. Only three gallbladders removed were diagnosed as normal, and these were in the group without stones. The pathologic diagnoses were: acute cholecystitis (11 per cent.); subacute cholecystitis (3 per cent.); chronic cholecystitis (85 per cent.), and normal gallbladder (1 per cent.).

POSTOPERATIVE NOTES

The last drains were removed much sooner in the cases in which the gallbladder was resected. If we leave out of consideration the cases with stones in the common duct, we find that 93 per cent. of the drained gallbladders were discharging bile through the incision for more than ten days after operation, while in only 38 per cent. of the cholecystectomies was there any drainage of bile after operation. More than four times as many of the drained gallbladders were still discharging bile through the incision on discharge from the hospital. The patients who had a cholecystectomy were in the hospital for a shorter period and were in better condition on leaving the hospital than were those who had drainage.

Cases in Which More Than One Operation Was Required.—There were eighty patients (11 per cent.) in the three groups who required more than one operation on the biliary tract. The first operation was performed at another hospital in forty-two of these cases. Of these eighty cases, thirty-eight were in the group with stones in the gallbladder, thirty-four in the group with stones in the common duct, and eight in the group without stones. The gallbladder was drained at the original operation in seventy-one cases (89 per cent.), while it was removed in only nine cases (11 per cent.). Of the nine patients operated on again following cholecystectomy, seven had stones in the common duct; the other two had a stricture of the common duct caused by injury incurred during the cholecystectomy. These two cases with strictures were successfully repaired.

TABLE 2.—*Individual Symptoms*

	Per Cent.
Pain	96
Radiation of pain	51
Indigestion	86
Nausea	76
Vomiting	73
Constipation	62
Eructation of gas	59
Chills and fever	42
Loss of weight	66
Jaundice	55
Itching of skin	13

The time elapsing between the operations was less than one year in 56 per cent. and less than five years in 86 per cent.

ULTIMATE RESULTS

We were able to follow 82 per cent. of the patients for an appreciable period of time following their discharge from the hospital. The patients from whom no reply was received (18 per cent.), those who died in less than a year after leaving the hospital of some sickness other than gallbladder disease (2 per cent.), and the ones who died more than one year after discharge from the hospital in whom the cause of death was not known but was thought not to be due to a recurrence of their former trouble (1 per cent.) will be omitted from the present consideration. The remaining 580 patients, or 79 per cent. of the total number, are divided into the four following classes and will be considered in the order named: (1) patients dying after operation during the same admission to the hospital; (2) patients well at time of the last reply, or who were free from gallbladder symptoms for at least one year before death from some other cause, who are considered as cured; (3) patients definitely improved by operation but not entirely free from gallbladder symptoms, and (4) patients not improved by operation or who had a recurrence of symptoms later. The patients who required more than one operation are classed according to their condition since the last operation.

All cases in which drainage of any part of the biliary tract was instituted will be considered as drainage of the gallbladder, provided a cholecystectomy was not done. In 280 cases, or 49 per cent. of 574, the gallbladder was removed, while it was drained in the remaining 294 cases (51 per cent.). The patients from whom no reply was received were divided almost equally between the two types of operations.

Class 1. Mortalities: Of the 735 patients operated on, 9.5 per cent. died while in the hospital, the mortality being 24 per cent. in the group with stones in the common duct, 6 per cent. in the group with stones in the gallbladder or cystic duct, and 7 per cent. in the cases without stones. The mortality percentage is strikingly lower now than it was in the early days of the hospital, as is evidenced by the fact that it has been only 1.3 per cent. among the last 153 patients on whom the operation was performed by the resident surgeon.

The causes of death were peritonitis (30 per cent.), hemorrhage (11 per cent.), pneumonia (11 per cent.), pulmonary embolism (6 per cent.), shock and weakness (11 per cent.), and various other causes in smaller numbers. Of these seventy patients, twenty-seven had definite pathologic conditions in addition to those present in the biliary tract, and these were directly responsible for the death in quite a few instances.

An analysis of the thirty-three cases in the group with stones in the common duct, in which the patients succumbed to operation, shows the following interesting points: Thirty-three per cent. had had at least one preceding operation; very dense adhesions were present in 75 per cent.; the fluid contents of the biliary tract were distinctly abnormal in 65 per cent.; additional pathologic conditions were present in 34 per cent.; 66 per cent. of the patients were in an acute attack at the time of the operation, as evidenced by severe pain or fever. It is also seen that in 60 per cent. of the mortalities in the other two groups, the patients were having an exacerbation of their trouble at time of operation.

Thirty-nine per cent. of the deaths occurred among patients from whom the gallbladder had been removed and 61 per cent. among those in whom it was drained. The higher mortality following drainage of the gallbladder cannot be explained by the condition of the patient at the time of the operation, as 7 per cent. more of the cases in which cholecystectomy was performed were in an acute stage at that time.

Eighty-six per cent. of the deaths followed operation by less than fifteen days. It has been stated earlier in the paper that two thirds of the entire number of patients were females, and it is of interest that only 44 per cent. of the fatalities were among that sex.

Class 2. Cures: This class comprises 416 cases, and constitutes 72 per cent. of the patients from whom a reply as to their exact condition was obtained. Eighty-three of these cases fall in the group with stones in the common duct, 263 in the group with stones in the gallbladder, and sixty-eight in the group without stones. The average time interval separating the operation and the last information concerning the patient was approximately ten years. The gallbladder was removed in 51 per cent. of these cases and drained in 49 per cent.

Class 3. Improved: The patients who were improved by the operation, but not completely cured, numbered sixty-three (11 per cent.) of the cases followed. Of these, forty fall in the group with stones in the gallbladder, seventeen in the group without stones, and six in the group with stones in the common duct. The gallbladder was drained in 51 per cent. of these cases, and removed in 49 per cent.

Class 4. No Improvement, or Recurrence of Symptoms: There are thirty-three cases in this class (6 per cent. of the cases followed), twenty-one of which belong to the group with stones in the gallbladder, five to the group with stones in the common duct, and six to the group without stones. The gallbladder was drained in nineteen of these cases, and removed in fourteen. If we add these to the cases in which a second operation was performed, we find that of 113 patients with recurrence of their former symptoms without permanent improvement, only 21 per cent. had had removal of the gallbladder, while it had been drained in 79 per cent.

SUMMARY

This paper presents a clinical study of 735 cases with a diagnosis of benign diseases of the biliary tract which have been in the surgical service of the Johns Hopkins Hospital. They are arbitrarily divided into three groups, depending on the presence or absence of stones, and the position of stones when present. An analysis was made of the various points in the histories, of the condition and treatment of the patients while in the hospital, and of the course of the cases since discharge. The comparison between the ultimate condition of the patients following cholecystectomy and cholecystostomy is of especial interest because almost the same number of each were performed, and the operations were performed by a relatively small number of surgeons, all of whom were trained under very nearly the same conditions. This comparison is slightly unfair, owing to the fact that more cholecystectomies have been performed in recent years, when the mortality percentages following both types of operations have been lower.

The following are some of the more important facts that were found in this study:

1. Disease of the biliary tract is much more common in the white race than in the colored, and in females

than in males (2:1). The highest incidence is found in the fifth decade, and very few patients were less than 30 years of age. Twenty-eight per cent. of the patients had had preceding typhoid fever, the highest percentage occurring in the group without stones.

2. The most common symptom was pain, indigestion ranking next in frequency. The least severe symptoms and those which had been present for the shortest period of time were found in the group without stones. By far the highest percentage of persistent jaundice had been present in the group with stones in the common duct.

3. Jaundice was present on physical examination in 39 per cent. of all cases, the highest percentage (80) being in the group with stones in the common duct. The liver was enlarged in 38 per cent. of the cases with stones in the common duct. The highest percentage of palpable gallbladders were found in the group with stones in the gallbladder. Tenderness on abdominal palpation was present in 77 per cent. of the cases, and muscle spasm in 44 per cent.

4. An achlorhydria was found in 23 per cent. of the gastric analyses. Only 13 per cent of the roentgenograms showed stones. The leukocyte counts were surprisingly low.

5. The cultures taken at operation were positive in 58 per cent. of the cases, *B. coli* and *B. typhosus* predominating. Only 1 per cent. of the gallbladders removed were diagnosed as normal.

6. There were right upper quadrant adhesions in 73 per cent. of the cases. Twenty-five per cent. of the patients had other abdominal pathologic changes in addition to those found in the biliary tract; appendicitis and pancreatitis constituted the greater part of these. The patients who had a cholecystectomy were usually in the hospital for a shorter period of time and were in better condition on discharge than were those who had had drainage of the gallbladder.

7. Eleven per cent. of the cases required more than one operation, and the first operation consisted of drainage of the gallbladder in 89 per cent. of these. The interval between the first and subsequent operation was less than one year in 56 per cent. of the cases and less than five years in 86 per cent. The common duct was injured sufficiently to make a plastic operation necessary in only two cases. It is quite important that the duodenum should be probed through the common duct at time of operation.

8. No replies were obtained from 18 per cent. of the patients, and 3 per cent. could not be classified as either cures or fatalities. Of the remaining 580 cases, 72 per cent. were cured by operation, 11 per cent. were improved, and 6 per cent. were unimproved. The mortality immediately following operation was 9.5 per cent., the highest percentage (24) falling in the group with stones in the common duct. The death rate was highest in the early days of the hospital and lowest in recent years (less than 2 per cent.).

9. The gallbladder was removed in 49 per cent. of all cases and drained in 51 per cent. The percentages of cured and improved cases following the two types of operations are about the same, but only 39 per cent. of the deaths followed cholecystectomy, whereas 61 per cent. followed drainage of the gallbladder. In addition, we see that 79 per cent. of the patients who had recurrence of symptoms (with and without another operation) had had the gallbladder drained at the original operation.

CONCLUSION

The points presented in this study would seem to justify the belief that the gallbladder should be removed in all cases in which it is definitely diseased, provided the condition of the patient is such that the added time under anesthesia will not lessen too greatly his chances of recovery.

ETHYLENE *

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The fact that ethylene was introduced as an anesthetic agent only some fifteen months ago, and received prompt and favorable consideration by the medical profession soon after, would seem to indicate that its advantages over the available general anesthetics are real. Not only have favorable reports with illustrative case histories been published in this country, but in the French medical literature a similar satisfaction is expressed with its properties as an anesthetic agent. It has been introduced recently and accepted enthusiastically in the surgical clinics of the Peking Union Medical College, Peking, China.

The favorable consideration that it has received was due in part to the laboratory work (on animals and man) that preceded and suggested its practical use. Had it not been, however, for the progressive scientific attitude of Drs. Dean Lewis and Arthur Dean Bevan and their anesthetists, Drs. Isabella Herb and Mary Lyons, who, following a demonstration, were anxious to give the gas its clinical test, ethylene might have remained and died in the laboratory whence it came.

Its present status will be amply described and discussed during this symposium. What its future will be, none can predict. Physiologically and pharmacologically, it is strikingly less toxic and dangerous than any of the other anesthetics, as judged by its effects at the time of administration or during the postanesthetic period.

Since ethylene-oxygen mixtures are, in proper concentrations, highly explosive, any serious accident (arising because of the use of a free flame, thermocautery, electric gas warming apparatus, or source of electric sparks of any kind in the immediate proximity) redounds to the utter discredit of this anesthetic, although ether-oxygen or ether-nitrous oxid-oxygen mixtures are as explosive under similar conditions. The hundred-odd ether accidents which occur in this country every year are not disclosed except when confidential experiences are exchanged in the closed circle of professional friends. Any possible ethylene accident occurring under similar conditions and in spite of repeated warning is broadcast throughout the land. Early in its use, ether must have received many rebuffs and much criticism because of its explosive nature. Ethylene will suffer the same experience and will survive, I hope, in spite of this handicap. The hazards from automobiles alone and the heavy death toll as the result of preventable accidents is incomparably greater than any dangers of ethylene even in the hands of rash adventurers. But the automobile is here to stay in spite of its menace to the community because of reckless driving, and its inherent defects.

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* From the Hull Physiological Laboratory, the University of Chicago.
* Read before the meeting on anesthesia in the Section on Miscellaneous Topics at the Seventy-Fifth Annual Session of the American Medical Association, Chicago, June, 1924.

The generation of ethylene in an impure form by some manufacturers will militate greatly against its further introduction and use. In the absence of any formulated standards for its production and purification as an anesthetic agent for human beings, some ethylene gas has been distributed whose pungent and vile odor alone is sufficient to condemn the product. The use of such gas, with attendant cyanosis, imperfect relaxation and subsequent prolonged emesis, adds to the utter disappointment and disgust of the surgeon and the anesthetist.

Without question, the laboratory animals used by us and reported on in our first publication inhaled a purer ethylene than was ever inhaled by man, because of the careful method of preparation and purification used. It was, indeed, most fortunate that the first tanks of commercial ethylene used in the clinic of the Presbyterian Hospital, Chicago, approached that degree of purity. Should the careless and unrestricted distribution of ethylene generated, collected and compressed under improper conditions continue, ethylene will fall into disuse and be discarded; for the use of such gas will obviously fail to bear out our published statements of the merits of the pure product and tend in time to discredit them. It is only fair to state in this connection that some distributors are thoroughly mindful of this situation and are bending every effort to supply the medical profession with a gas of the highest grade of purity.

Turning now abruptly from the other practical aspects of the problem, which are to receive full consideration presently by the speakers and members of this section, I take the liberty to call attention particularly to two facts which are of more general significance and which are readily overlooked and too easily forgotten.

Of foremost significance is the fact that the analgesic and anesthetic properties of ethylene gas were discovered in the course of an investigation designed to determine the exact degree of toxicity of the gas for the lower animals, it having been previously determined by botanists to be exceedingly toxic for flowering carnations, sweet pea seedlings, and the castor bean plant. From the point of view of any practical man, including the ultrapractical man of our own profession, this problem offered no aspect worthy of consideration. All *a priori* considerations pointed strongly to the probability that it would prove as toxic to animal protoplasm as it had proved to be for vegetable protoplasm. And if found toxic, another useless and fatal drug would have been added to the many others referred to in encyclopedic treatises on pharmacology. In short, then, the anesthetic properties of ethylene gas were discovered in a physiologic laboratory in the course of experimentation, and on a problem which certainly was academic; and, far from promising a practical measure for the clinic, it even suggested quite the opposite outcome. It is but one of the many examples of practical measures which had their origin in the laboratories of the fundamental sciences.

For the prosecution of the problem, vivisection in its widest sense was a prime necessity. Had vivisection been denied, the analgesic and anesthetic properties of ethylene gas would not have been discovered. To those, even in our profession, who take exception to vivisection for one reason or another but chiefly on the alleged basis that results obtained from the frog, guinea-pig, dog, etc., are devoid of significance because they are not transferable to man, I point out that in this specific instance, as in many others, the results obtained from the usual laboratory animals compare most favorably with those obtained from man at subsequent trials, with this exception, that man is apparently more susceptible to the influence of ethylene gas than are the lower animals. At any rate, without animal experimentation, ethylene gas would not be found in the clinic today. Its presence there is due, furthermore, to the splendid cooperation of the chiefs and staff of the Presbyterian Hospital, Chicago, after Mr. Carter and I demonstrated its action on ourselves to them.

In view of the great value of the work of the laboratories in the sciences fundamental to medicine, as evidenced by their numerous contributions to practical medicine in the past, and in the hope that misguided men and legislators will not create legal barriers against animal experimentation and vivisection so necessary for the rapid progress of research in these sciences, it is expected that future thought and work will continue to bring to light therapeutic measures of the greatest value in the care and cure of the sick, and, furthermore, give to mankind a general anesthetic better than either ether, nitrous oxid or ethylene.

ETHYLENE IN OBSTETRICS*

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In the maternity section of the Presbyterian Hospital, Chicago, we have used ethylene and oxygen 215 times during the last year, with very satisfactory results. For operative obstetric work it is without approach among anesthetics, since so many women requiring operative delivery are jeopardized. Bronchitis, nephritis, myocarditis, valvular heart disease, high blood pressure and eclampsia are not infrequent complications of labor requiring operative intervention. In such cases the choice of an anesthetic is a matter of great importance.

Ether is a pulmonary irritant and, in addition, is injurious to the kidney and liver—organs already damaged by the intoxication of pregnancy. Women who have had cesarean section not infrequently become precariously ill after ether from acute dilatation of the stomach. The frequency of this alarming condition is a big argument against cesarean section as an elective method of delivery in cases of grave heart disease, because the advantages of the operative delivery may be nullified by the serious heart strain produced by vomiting. Severe gas pains, loss of sleep, and consequent fatigue militate against recovery in certain seriously injured patients.

Nitrous oxid would be an ideal anesthetic for operative obstetrics if its relaxing qualities were as great as is its freedom from postoperative objections. However, it does not give sufficient relaxation to permit more than a few obstetric manipulations with safety and satisfaction. Rarely have we been able to complete a cesarean section under nitrous oxid and oxygen without the addition of ether. And, if accomplished, there is liable to be embarrassing straining at critical points during the operation. For at least twenty years, local anesthesia has been used at the Presbyterian Hospital in certain extremely critical cases requiring cesarean

* Read before the meeting on anesthesia in the Section on Miscellaneous Topics at the Seventy-Fifth Annual Session of the American Medical Association, Chicago, June, 1924.

section, when marked intoxication existed, associated with heart or lung complications. In such cases the serious effects of fright on the damaged heart of the conscious patient has been entirely overlooked in the effort to avoid the toxic effects of a general anesthetic, frequently to the patient's detriment.

Ethylene and oxygen is entirely sufficient for every obstetric operation without the addition of ether. It is of particular advantage in the cases of grave operative risk just mentioned. It is not irritating to the lungs or kidneys. It has no postadministrative effect on the hemoglobin of mother or child. It can be given without asphyxia or jactitation. The patient quickly returns to consciousness. If vomiting occurs, it is usually insignificant and transitory. It does not produce paralyses of peristalsis, and there is as little postoperative complaint as we meet after local anesthesia. Since using ethylene, I have discarded local anesthesia in all obstetric as well as in gynecologic work. Dr. Hewitt, Dr. Kanter, Dr. Culbertson and I have done twenty-one abdominal cesarean sections under ethylene. It was not necessary to add ether in a single case. The baby cried as quickly in each instance as when local anesthesia was given. The uterus contracted as well as when nitrous oxid was used. The patients left the table with dry skins, and were entirely coordinate by the time they were placed in bed. None of them had persistent vomiting. Gas pains were no more troublesome than after abdominal operations under local anesthesia. In addition, we have done versions and extractions, difficult forceps operations, vaginal cesarean sections, manual removal of the placenta—all with entire satisfaction. The only requisite is that the anesthetist devote himself to his duty and not be distracted by the excitement of an emergency operation, since a patient under ethylene is in more delicate balance than when under ether.

We have used ethylene for the conduct of normal labor, starting when the patient first demands relief, giving it only with the pains as we do nitrous oxid, and continuing until at the last it is pushed to the anesthetic stage for the actual delivery. We have given it for as long as nine hours in a single case. Ethylene is quicker than nitrous oxid, and the patient becomes more rapidly analgesic. No more complaint is made of its odor than that of nitrous oxid. Uterine bleeding is somewhat greater than with nitrous oxid, but is far less than with ether.

When given intermittently, as in the conduct of labor, there is a greater chance of explosion than when given continuously, as in surgical work, for there is a greater opportunity of static ignition; first, by the contact of persons in the room with the machine, and then by the striking of one part of the apparatus against another. If ethylene is to be administered, care should be taken that the floors of the operating room are not electrified and that there is a continuous metallic contact from the patient's mask to the machine, and that the machine itself is grounded to a water pipe or radiator. We had two sharp explosions in our delivery room, both due to static sparks. Fortunately, no one was injured. These were the only two explosions in more than 3,000 ethylene administrations at the hospital, and they were in the same delivery room, with the same anesthetist.

Ethylene is without equal as an anesthetic for operative obstetrics, particularly in grave surgical risks, and it is superior to nitrous oxid in the conduct of normal labor.

104 South Michigan Avenue.

THE EFFECT OF ETHYLENE-OXYGEN ANESTHESIA ON THE ACID-BASE BALANCE OF BLOOD

A COMPARISON WITH OTHER ANESTHETICS *

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Among the most noteworthy features of ethylene-oxygen anesthesia, as noted in the clinical report of Luckhardt and Lewis,[1] are the facts that recovery from the anesthetic is unusually prompt and that the subsequent postoperative condition is distinctly better than after ether. Less than half as many patients suffer from postanesthetic nausea and vomiting after ethylene-oxygen as in a comparable series after ether. These considerations led Dr. A. B. Hertzman and me to try to ascertain whether any differences might be noted between the effect of ethylene-oxygen anesthesia on the acid-base balance of blood and the now well recognized acidotic effect of ether. This action of ether may be a considerable factor in contributing to the postanesthetic complications following etherization.

FACTORS INFLUENCING BLOOD REACTION IN ANESTHESIA

Apart from the doubtful possibility that anesthetic agents may themselves exert a direct action on the acid and basic elements of bloods, variations in three important body functions resulting from the anesthesia may influence the blood reaction. These are (*a*) respiration, (*b*) carbohydrate metabolism and (*c*) kidney excretion. There is no agreement as to the relative importance of these factors.

Respiration.—The respiratory factor has been emphasized by the adherents of the acapnial theory. In ether anesthesia, however, it has been rather clearly demonstrated by many independent observers that an immediate and marked fall in the blood p_H occurs, leading to a condition of uncompensated alkali deficit, as defined by Van Slyke.[2] Were the fall in alkali reserve observed under ether due to the blowing off of carbon dioxid, as maintained by Henderson and Haggard,[3] the blood p_H would be expected to rise. No rise in blood p_H under ether has ever been reported. It was shown by Carter,[4] however, that the alkali reserve under ether fell, even though the carbon dioxid content of inspired air was maintained at 3 per cent. Under these conditions, an acapnia was impossible. Van Slyke, Austin and Cullen[5] found that the p_H of blood falls at once in ether anesthesia, and that the alkali reserve continues to fall as the p_H remains low. This confirmed the work of Atkinson and Ets.[6] Finally, in a series of experiments

* From the Department of Pharmacology of the University of Wisconsin Medical School.
* Read before the meeting on anesthesia in the Section on Miscellaneous Topics at the Seventy-Fifth Annual Session of the American Medical Association, Chicago, June, 1924.

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2. Van Slyke, D.D.: Studies of Acidosis, XVII, The Normal and Abnormal Variations in the Acid-Base Balance of the Blood, J. Biol. Chem. 49:153 (Sept.) 1921.
3. Henderson, Yandell; and Haggard, H. W.: Respiratory Regulation of CO_2 Capacity of Blood: 1, High Levels of CO_2 and Alkali; 2, Low Levels of CO_2 and Alkali Induced by Ether: Their Prevention and Reversal, J. Biol. Chem. 53:333, 345 (Feb.) 1918.
4. Carter, W. S.: The Effect of Ether Anesthesia on the Alkali Reserve, Arch. Int. Med. 26:319 (Sept.) 1920.
5. Van Slyke, D. D.; Austin, J. H., and Cullen, G. E.: Effect of Ether Anesthesia on Acid-Base Balance of Blood, J. Biol. Chem. 53:277 (Aug.) 1922.
6. Atkinson, H. V., and Ets, H. N.: Chemical Changes of the Blood Under the Influence of Drugs, 1, Ether, J. Biol. Chem. 52:15 (May) 1922.

in which etherization was prolonged for several hours, with lung ventilation accurately recorded by a body plethysmograph, my associates and I [7] showed that these changes in blood reaction took place independently of respiratory variations.

These findings are in no way antagonistic to the use of carbon dioxid for the purpose of de-etherization on the completion of an operation, as proposed by Henderson, Haggard and Coburn.[8] They do indicate, however, that the removal of carbon dioxid by excessive respiratory activity in ether anesthesia has little influence on the effects of this agent on blood reaction.

In nitrous oxid and ethylene anesthesia, a factor closely related to respiratory variations must be included among those influencing blood reaction. This is the possibility of an anoxic anoxemia, as termed by Barcroft.[9] Under ether or chloroform, this factor is insignificant unless the anesthesia is forced to asphyxiation.

Normal arterial blood is more than 92 per cent. saturated with oxygen at the oxygen tensions ordinarily inspired. An oxygen saturation below this figure indicates anoxemia. It is impossible to maintain satisfactory nitrous oxid and oxygen anesthesia without a considerable degree of anoxemia. Greene [10] states that unless the arterial blood is less than 80 per cent. saturated with oxygen under nitrous oxid and oxygen, anesthesia is not present, and probably not even analgesia. With ethylene, since more oxygen can ordinarily be admitted to the anesthetic mixture than with nitrous oxid, the factor of anoxemia is not quite so important. It is, nevertheless, probably present in the majority of cases, since in the anesthetic mixture with ethylene usually employed, the oxygen tension is considerably less than in the customarily inspired normal atmosphere.

The effects of an anoxic anoxemia on blood reaction have been indicated by the work of Koehler, Brunquist and Loevenhart,[11] in which pigs were subjected, under carefully controlled conditions, to atmospheres low in oxygen. An initial mobilization of blood alkali occurred, followed by a rapidly developing uncompensated alkali deficit. These authors believe that the initial alkalosis is compensatory to an acapnia brought on by the increased respiratory activity under the stimulus of oxygen want.[12] This type of response in blood reaction was noted by Cullen and his associates [13] for nitrous oxid, and these observations have been confirmed by Dr. Hertzman and myself.[14] We also noted this type of response in ethylene-oxygen anesthesia when anoxemia was present, as shown by direct determinations of the oxygen saturation of arterial blood.

Carbohydrate Metabolism.—The respiratory variations in anesthesia as factors influencing blood reaction are directly concerned with the amount of carbon dioxid in the blood, since this is the chief, if not the only, volatile acid present. Indirectly, the respiratory variations in anesthesia are related to the formation of nonvolatile acids, represented by the ketone bodies and lactic acid, which may accumulate in the blood when oxidative processes are depressed. The interference with carbohydrate metabolism leading to the formation of these acids may proceed from two sources: (*a*) the anoxic anoxemia as noted above, or (*b*) from a depression of the normal insulin secretion of the pancreas.

Evidence has been presented by Ross and Davis [15] that both ether and chloroform produce a hyperglycemia by an inhibition of the internal secretion of the pancreas. One of the most unpleasant complications following ether anesthesia is the development of an acidosis a day or so after the operation. This acidosis is due to the accumulation of ketone bodies, and, as Thalhimer [16] so neatly demonstrated, may be promptly relieved by the administration of insulin. As Thalhimer [16] suggests, this postanesthetic ketosis may originate in some slight abnormality of carbohydrate metabolism (such as the suppression of insulin secretion under the action of the anesthetic, with the consequent hyperglycemia, as postulated by Ross and Davis [15]); and the supervention of a vicious cycle, through starvation perhaps, at this critical period causes the ketosis to develop and persist until broken at some point. It is significant that the postanesthetic ketosis develops a day or more after etherization, since the ketone bodies do not tend to accumulate during etherization, even if prolonged for several hours.[7]

A hyperglycemia has been observed in all important types of anesthesia. We have found a moderate rise of blood sugar during ethylene-oxygen anesthesia, whether anoxemia is present or not. The appearance of this hyperglycemia is not as prompt as during ether anesthesia. It is well known that an increase in blood or tissue acidity, especially in the liver, produces a greater susceptibility toward the appearance of a hyperglycemia. It may be that the initial acidosis of ether and chloroform anesthesia is a considerable factor in contributing to the more pronounced derangement of carbohydrate metabolism noted after the use of these anesthetics than after the use of gas anesthetics.

Faulty carbohydrate metabolism usually finds expression in the appearance and symptoms of a ketosis. This does not develop in ether and chloroform anesthesia until a day or more has elapsed. In ethylene-oxygen anesthesia, however, there is an increase in the amount of ketone bodies in the blood during the anesthetic period. The increase is not large, but may be sufficient to account for the tendency to develop an uncompensated alkali deficit. This difference between ether and chloroform, on the one hand, and ethylene-oxygen, on the other, with regard to the formation of ketone bodies during anesthesia, may be due to: (*a*) a difference in effect on insulin secretion; (*b*) a difference in the initial primary effect on blood reaction (the cause of which, in ether and chloroform, is unknown), or (*c*) a difference in the degree of anoxemia present.

Kidney Function.—Although recognized to be of great importance, the effects of variations in kidney function in anesthesia on the blood reaction are not clearly understood. An increase in the total acidity of urine following etherization has been noted by Reimann and Hartman,[17] while practically no change in total

7. Leake, C. D.; Leake, E. W., and Koehler, A. E.: The Acidosis of Ether Anesthesia in the Dog, J. Biol. Chem. **60**: 319 (June) 1923.
8. Henderson, Yandell; Haggard, H. W., and Coburn, R. C.: The Therapeutic Use of Carbon Dioxid After Anesthesia and Operation, J. A. M. A. **74**: 783 (March 20) 1920.
9. Barcroft, J.: Anoxemia, Lancet **2**: 485 (Sept. 4) 1920.
10. Greene, C. W.: The Oxygen and Nitrous Oxid Content of Blood of Dogs During Nitrous Oxid Anesthesia, J. Pharmacol. & Exper. Therap. **23**: 158, 1924.
11. Koehler, A. E.; Brunquist, E. H., and Loevenhart, A. S.: The Production of Acidosis by Anoxemia, J. Biol. Chem. **58**: 9, 1923.
12. Gasser, H. S., and Loevenhart, A. S.: The Mechanism of Stimulation of the Medullary Centers by Decreased Oxidation, J. Pharmacol. & Exper. Therap. **5**: 239, 1914.
13. Cullen, G. E.; Austin, J. H.; Kornblum, K., and Robinson, H. W.: The Initial Acidosis in Anesthesia, J. Biol. Chem. **60**: 625 (June) 1923.
14. Leake, C. D., and Hertzman, A. B.: Blood Reaction in Ethylene and Nitrous Oxid Anesthesia, J. A. M. A. **82**: 1162 (April 12) 1924.
15. Ross, E. L., and Davis, L. H.: The Rôle of the Pancreas in Hyperglycemia from Ether, Am. J. Physiol. **53**: 391 (Oct.) 1920.
16. Thalhimer, William: Insulin Treatment of Postoperative (Non-diabetic) Acidosis, J. A. M. A. **81**: 383 (Aug. 4) 1923.
17. Reimann, S. P., and Hartman, F. L.: Effect of Anesthesia and Operation upon Certain Metabolites, Am. J. Physiol. **50**: 82 (Oct.) 1919.

urine acidity during etherization was found by Collip.[18] It has been shown by MacNider [19] that the anuria under ether comes on slowly, and, while not directly related to the fall in alkali reserve, may be alleviated by the administration of alkali. Stehle, Bourne and Barbour [20] studied the rate of sodium and potassium excretion in ether anesthesia, and found a great decrease during etherization, but such a marked increase after anesthesia that the total amount of these alkalis eliminated for the experimental day was abnormally high. When morphin was administered before etherization, the rate of sodium and potassium excretion was increased both during and after the anesthesia. Now Dr. Koehler and I [21] have shown that morphin causes a marked rise in the ketone bodies of the blood, enough in fact to lead to a transitory alkali deficit, presumably by neutralization. It is likely that the excretion of these ketone substances, neutralized by available blood alkali, caused the excessive elimination of sodium and potassium both during and after the morphin-ether anesthesia in the animals studied by Stehle and his associates. On the other hand, in simple ether anesthesia, the anuria could be held responsible for the reduction in the rate of alkali elimination during etherization; while the possible development of a ketosis after the anesthesia, as noted above, with the neutralization of these ketone bodies by available alkali, and subsequent excretion in the urine, could be considered an explanation for the postanesthetic increase in alkali elimination noted by these workers. Of course, other acid bodies may play an exceedingly important rôle in this connection.

In this connection, the more recent work of Stehle and Bourne [22] is of extreme interest. These authors suggest that the low alkali reserve and increased acidity of the blood in ether anesthesia is due to the discharge of phosphoric acid from the muscles. Their experimental and clinical studies furnish excellent evidence for this opinion. Owing to the anuria or oliguria that often occurs in anesthesia, the phosphoric acid discharged from the muscles may not be excreted at once, but may be retained in the liver until after the anesthesia, when it may be eliminated in combination with sodium or potassium, thus explaining the increased excretion of these bases following anesthesia, as noted previously by these workers.[20]

BLOOD REACTION UNDER ANESTHETICS OTHER THAN ETHYLENE

A brief summary may now be made of the facts known with regard to the effect of the chief anesthetic agents on blood reaction so that a comparison may be made between them and ethylene on this basis. It may be said in passing, in view of the lack of general systemic action under local anesthetics, unless in toxic doses, that such agents have practically no effect on the acid-base equilibrium of the blood.[23]

Ether anesthesia causes a marked and almost immediate fall in both the p_H and alkali reserve of blood, leading rather rapidly to a condition of uncompensated alkali deficit. This response appears to be independent of respiratory variations under the effect of ether, and is apparently not caused by the formation of ketone bodies or lactic acid. A ketosis may develop several hours after the withdrawal of ether, as the result of deranged carbohydrate metabolism apparently related to the depressing action of ether on the insulin secretion of the pancreas.

Chloroform anesthesia produces practically the same changes in blood reaction as those noted for ether. According to the results of a few experiments that Dr. Hertzman and I made on ethyl chlorid as a general anesthetic, this substance also has the same general effects on the acid-base balance of blood as those observed under ether.

Under nitrous oxid and oxygen, it is impossible to maintain satisfactory anesthesia without some degree of anoxemia. The effects of this anesthetic mixture on blood reaction seem to be due largely to this associated anoxemia. These effects are an initial rise in blood p_H, with inconstant changes in the carbon dioxid content (indicating a mobilization of blood alkali), followed by a fall in both the p_H and carbon dioxid content (indicating the development of an uncompensated alkali deficit). These changes are neither as rapid nor as marked as those observed under ether or chloroform.

BLOOD REACTION UNDER ETHYLENE AND OXYGEN

It is a significant feature of ethylene-oxygen anesthesia that mixtures of from 85 to 90 per cent. ethylene with 15 to 10 per cent. oxygen, respectively, may be used to induce anesthesia, while concentrations of from 80 to 85 per cent. ethylene with 20 to 15 per cent. oxygen, respectively, may often be sufficient to maintain it. Thus, except in the few moments of induction, the anoxemia factor, which is apparently so important under nitrous oxid and oxygen, will not be so significant for ethylene-oxygen anesthesia. The experimental results of Dr. Hertzman and myself,[14] although unconfirmed, are interesting in this connection. We found the effects of ethylene-oxygen anesthesia on blood reaction closely related to the degree of anoxemia present. We determined the extent of anoxemia by direct estimations of the oxygen saturation of arterial blood. If anoxemia was present, we found the same type of response in blood reaction as noted for nitrous oxid and oxygen anesthesia; that is, an initial mobilization of blood alkali followed by a tendency toward a condition of uncompensated alkali deficit. The initial rise in blood p_H was somewhat dependent on the extent of anoxemia. If no anoxemia was present, both the p_H and carbon dioxid content of the blood fell slightly, but not beyond normal limits after forty minutes' anesthesia. We have performed more experiments along this line, and our results are uniformly in accord with the figures we have already published. We have, however, made the further observations that the ketone bodies tend slowly to accumulate in the blood, especially in the presence of anoxemia, and that the blood sugar tends to rise during the anesthetic period. Our observations, unfortunately, do not extend over anesthetic periods longer than fifty minutes, so that we cannot say toward what limits the tendencies noted will develop.

With ethylene, then, if sufficient oxygen is present to maintain the oxygen saturation of arterial blood within normal limits, no material effects on blood reaction may be expected to follow, beyond those that may secondarily result from the supposed deranged oxygen

18. Collip, J. B.: The Effect of Surgical Anesthesia on the Reaction of Blood, Brit. J. Exper. Path. **1**: 282 (Dec.) 1920.
19. MacNider, W. de B.: Anuria Occurring in Normal Animals During the Use of General Anesthetics, J. Pharmacol. & Exper. Therap. **15**: 249 (June) 1920.
20. Stehle, R. L.; Bourne, W., and Barbour, H. G.: Effects of Ether Anesthesia Alone or Preceded by Morphine upon the Alkali Metabolism of the Dog, J. Biol. Chem. **53**: 341 (Aug.) 1922.
21. Leake, C. D., and Koehler, A. E.: Blood Reaction Under Morphine, Arch. Internat. Pharmacol. Therap. **27**: 221, 1922.
22. Stehle, R. L., and Bourne, W.: The Mechanism of Acidosis in Anesthesia, J. Biol. Chem. **60**: 16 (May) 1924. Bourne, Wesley; and Stehle, R. L.: The Excretion of Phosphoric Acid During Anesthesia, J. A. M. A. **83**: 117 (July 12) 1924.
23. Rose, M. E.: Acidosis in Surgical Anesthesia, Illinois M. J. **41**: 6 (Jan.) 1922.

absorption or utilization in the central nervous system, as postulated by Wieland [24] to explain the narcotizing action of the gas. However, if it is necessary to administer ethylene in such amounts that anoxemia results, then primary changes in the acid-base balance of the blood may be expected, as a consequence, to develop along the paths suggested by Loevenhart and his associates [11] for anoxemia in general, and as shown to take place under nitrous oxid and oxygen anesthesia, in which anoxemia is probably always present.

COMMENT

In view of the fact that blood reaction changes in ethylene-oxygen anesthesia are generally less even than those under nitrous oxid and oxygen, it may be that an explanation can be offered on these grounds for the more satisfactory postanesthetic condition of patients after ethylene-oxygen than after other types of anesthesia. The importance of the oxygen supply in anesthesia is emphasized by this entire discussion. If a gaseous anesthetic can be found, with which the concentration of oxygen administered can be greater even than that with ethylene, and which itself will have no marked influence on blood reaction or other toxic result, a more nearly ideal anesthetic agent than any yet in use may be discovered. Acetylene has been advanced as such an agent by Gauss and Wieland,[25] but it has objections on account of its odor and explosibility. By colorimetric determinations of the p_H of blood plasma, Dr. Hertzman and I have ascertained that the effects of acetylene-oxygen anesthesia on blood reaction are similar to those noted for ethylene-oxygen when no anoxemia is present. Schoen [26] has noted, however, that an acidosis is present from the beginning of anesthesia with acetylene-oxygen. From our work, we do not feel that the development of an acidosis in acetylene-oxygen anesthesia, or in anesthesia with ethylene-oxygen when no anoxemia is present, is nearly as rapid or as marked as in anesthesia with ether, chloroform or ethyl chlorid.

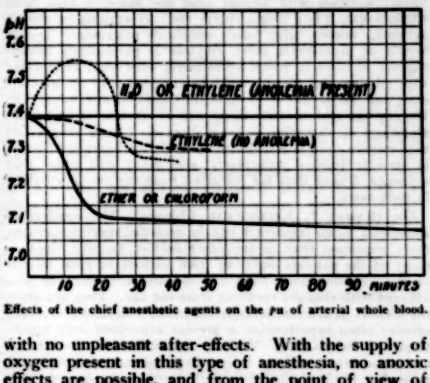
In a remarkable synopsis of anesthetics published by Richardson,[27] in 1885 (including among many others, an account of the anesthetic properties of ethylene), attention was directed to dimethyl oxid or methyl ether. Richardson says:

> I consider methylic ether to be the safest of all anesthetics hitherto discovered. Pigeons and rabbits will remain in full anesthetic atmosphere for twelve minutes without dying, and, allowed to die, are recoverable by artificial respiration seven minutes after cessation of all forms of life. The one practical objection to methylic ether as an anesthetic consists in its being a permanent gas at ordinary temperatures. I have administered it successfully twenty-seven times to the human subject.

Richardson states that methyl ether may be administered with 25 per cent. oxygen, that it is pleasant to breathe, and that it causes no irritation. The anesthetic action is rapid and without any manifestation of a spasmodic stage. The recovery from deep anesthesia is rapid and unattended by any bad symptom or vomiting. It is peculiar that a substance with such anesthetic properties should have been forgotten for so long. It is to be hoped that work may be inaugurated to ascertain the truth regarding these statements of Richardson.

Some recent experimentation has been done by Brown [28] on dimethyl oxid or methyl ether, in which he finds that anesthesia may be produced with concentrations of 65 per cent. methyl ether, the remainder being oxygen. He states, however, that it is most unpleasant to take, and that recovery seems delayed.

The independent experimental work of Halsey and his associates [29] and of Brown [28] justifies considerable interest in propylene-oxygen anesthesia. Anesthesia may be rapidly induced with 40 per cent. propylene and 60 per cent. oxygen, and may be maintained with from 20 to 30 per cent. propylene, the remainder being oxygen or air. It is not unpleasant to inhale, it has no effects on blood pressure, and recovery is rapid,



Effects of the chief anesthetic agents on the p_H of arterial whole blood.

with no unpleasant after-effects. With the supply of oxygen present in this type of anesthesia, no anoxic effects are possible, and from the point of view of blood reaction, propylene-oxygen anesthesia should be as ideal as acetylene-oxygen anesthesia.

SUMMARY

A graphic summary of the effects of the chief anesthetic agents on blood reaction is presented in the accompanying chart. The curves are not constructed from the data of any single experiment, nor from the averaged results of similar series, but they conform to the findings noted, and give a general picture of the situation.

Ether and chloroform cause a rapid and marked lowering of the blood p_H; nitrous oxid and oxygen lead to an initial alkalemia, followed by a tendency toward an acidemia; ethylene-oxygen with anoxemia present gives the same picture as nitrous oxid and oxygen, while ethylene-oxygen without anoxemia causes a gradual lowering of the blood p_H, not beyond normal limits after forty minutes' anesthesia.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. LUCKHARDT, HEANEY AND LEAKE

DR. CAREY CULBERTSON, Chicago: My experience with ethylene gas has been limited to gynecology and obstetrics. The advantages of ethylene over nitrous oxid have been brought out: better relaxation, more speedy analgesia, absence of cyanosis, normal appearance of the patient, and absence

24. Wieland, H.: Ueber den Wirkungsmechanismus betaübender Gase, die Stickoxyduls und des Acetylens, Arch. f. Exper. Path. u. Pharmakol. 92: 96, 1922.
25. Gauss, C. J., and Wieland, H.: Ein neues Betaübungsverfahren, Klin. Wchnschr. 2: 113 (Jan. 15); 158 (Jan. 22) 1923.
26. Schoen, R.: Blood Gases in Acetylene Anesthesia, München. med. Wchnschr. 71: 889 (July 4) 1924.
27. Richardson, B. W.: A synopsis of Anesthetics, Scient. Am. (Supplement) 20: 8227, 8240, 1885.
28. Brown, W. E.: Experiments with Anesthetic Gases Propylene, Methane, Dimethyl-Ether, J. Pharmacol. & Exper. Therap. 23: 485 (July) 1924.
29. Halsey, J. T., Reynolds, C., and Cook, H. B.: A New Anesthetic Gas, New Orleans M. & Surg. J. 77: 29 (July) 1924.

of muscular disturbance so often seen in nitrous oxid anesthesia. There is an odor, but the odor is not disagreeable. The postoperative reaction has been mentioned. We have used gas anesthesia in labor at the Presbyterian Hospital for many years; we began using nitrous oxid, and frequently would give the patient enough ether at the expulsion of the head to secure better relaxation. Using ethylene gas, we do not need ether. Formerly we carried the case through labor with nitrous oxid, and if we needed to terminate artificially by forceps or extraction, we would use ether for the few minutes that that procedure required. Now, we find that the ethylene gas is sufficient. In gynecology, everything that Dr. Heaney said I endorse; the use of this gas has been found most satisfactory in pelvic work, both in the lower plastic work, and in intra-abdominal operations. Some surgeons claim that there is more hemorrhage with ethylene gas in plastic surgery than with nitrous oxid. I have not found that to be so; the difference is rather the character of the blood; working with nitrous oxid the blood is blue, with ethylene gas, it is a bright cherry red. In working on elderly patients, women who have umbilical protrusion, ventral hernia or procidentia uteri, ethylene is particularly advantageous in cases in which we formerly used local anesthesia; with ethylene gas these operations are done with the greatest ease, and the patient is in excellent condition afterward. Dr. Heaney has spoken of the advantage of ethylene in such complications of obstetrics as heart disease. I have always felt that nitrous oxid is not desirable when the heart is affected, in stenotic lesions particularly, and, being still under that influence, I have thus far refrained from the use of ethylene in such cases.

Dr. Herman L. Kretschmer, Chicago: The problem of anesthesia is an important one in urologic surgery, perhaps more important than in any other field of surgery, since so many of the patients suffering from various surgical lesions of the genito-urinary tract are old and are more or less afflicted with changes resulting from old age. They are often the victims of arteriosclerosis, sometimes mild and sometimes severe; often hypertension is present associated with hypertrophy of the prostate. Various organic lesions of the heart are encountered, such as myocarditis, coronary sclerosis and auricular fibrillations. Especially are we concerned with lesions of the lungs, such as chronic bronchitis and emphysema, which are so common in later life. The presence of these conditions, and the desire to avoid or to minimize as much as possible such postoperative pulmonary complications as pneumonia, make it desirable to have a safe, simple and nonirritating anesthetic for this group of cases. We have used ethylene in 260 cases. We like ethylene for many reasons, the chief one of which is the rapidity with which the anesthesia is induced, and also because the patients recover very quickly from the anesthesia. We believe that it is the anesthetic of choice in cases in which the patients have damaged kidneys. It is particularly valuable in producing a short, rapid anesthesia in treating cases of carcinoma of the prostate by means of inserting radium on spears through the perineum. The anesthetic demands are only those of a short, rapid anesthetic. Relaxation obtained with ethylene in surgery of the bladder is very gratifying, particularly in cases of carcinoma in which wide resections were carried out. Often in cases of genito-urinary tuberculosis, patients have active lesions in the chest. In view of the fact that ethylene does not produce pulmonary irritation, I believe it is an ideal anesthetic in this group of cases. The question has been brought up about bleeding. It has not been my experience that there is more bleeding either during or after the operation. We have also used ethylene in the treatment of bladder tumors by means of fulguration. In this group we have been particularly careful to have the apparatus covered so as to avoid the possibility of explosion from the spark of the machine. Not only have we kept our machine covered, but we were careful to open all doors and windows before starting the fulguration. I believe that from the standpoint of the genito-urinary surgeon ethylene fulfils the most critical demand that might be made.

Dr. Willard Bartlett, St. Louis: The complaisance with which we treat ethylene is very interesting, in view of the fact that ethylene has been placed by the *Scientific American* among the five greatest discoveries in the twelve months which were distinguished by its birth. Our anesthetists began to give it, Aug. 2, 1923. Do no let anybody tell you that you cannot get a deep anesthesia with ethylene. We have two anesthetists who give it for abdominal operations, and if it does not go deep enough, they turn on ether, unless the head anesthetist is about, when we call him and do not need ether. It is really easy to give for simple things; for minor surgery, these people that are giving it for us say it is very much simpler than the administration of oxygen and nitrous oxid combined. In regard to the combination of nitrous oxid or the use of ethylene: We do a large number of goiter operations, and that frequently means two anesthesias. Two ethylene anesthesias should not be given in succession on two days. The patient will not permit it, on account of the smell. Do not let anybody tell you it does not stink. It does. I cannot see why men talk about setting fire to it. I think the matter of inflammability is beyond discussion. One can employ a cautery, by heating to a black heat outside the operating room. About bleeding: I never heard a surgical specialist or saw one operate who was interested in minor bleeding. I think these men are so vitally interested in more important aspects of the specialty that they do not know whether a wound bleeds a bit or not. Let us general surgeons show you some ethylene in surgery and we will show you more bleeding than you will get in any other way; but it is a godsend. Vessels bleed while the wound is open, and the bleeding caused by the ethylene ceases just the minute the administration of it is discontinued; hence, no wounds are closed over open vessels that will bleed after closure.

Dr. Isabella C. Herb, Oak Park, Ill.: For many years, caution and conservatism have controlled the anesthetic service in the Presbyterian Hospital; consequently, we have been slow in adopting any agent or method which carried with it greater risks than the agent or method which through experience we had found comparatively free from danger. The immediate and remote effects of ethylene-oxygen anesthesia on the tissues had been thoroughly investigated by Luckhardt and Carter, physiologists of unquestioned reliability; consequently, after a remarkably successful demonstration of its anesthetic properties it became our problem to determine its value in actual operative work. As we were the pioneers in the administration of ethylene-oxygen for surgical operations, it may well be imagined that we approached our problem with the utmost caution, and only patients in a good state of health, requiring minor operations, were chosen; but as we became familiar with the method of administration, the signs of anesthesia and the effect on the circulation and respiration we extended its use to the severely handicapped patients and its use to major surgery till today we are employing it for every kind of operation. By this I do not wish to be understood that we are using it to the exclusion of all other general anesthetic agents, for there are certain operations in the upper abdomen for which we prefer ether or a combination of ether and ethylene-oxygen. The results of ethylene-oxygen narcosis in the hands of competent administrators has been such that no one can any longer doubt its real value as an anesthetic agent. The two explosions of which Dr. Heaney spoke occurred in the same delivery room and in the hands of the same administrator. In the first instance, at the cessation of a pain the anesthetist placed the cone on the head of the machine, thereby bringing two metal surfaces in sudden contact, which doubtless produced a static spark. In the second instance, he was holding the cone preparatory to the administration and could not recall whether he had made a contact between the metal table and the metal on the cone. Fortunately, the only damage done was the rupture of the rubber tubing leading from the machine to the cone and the breaking of the glass dial over the mixing chamber. The escaping mixture burned with a slight bluish flame, which was easily blown out with the breath. Contrary to distressing me, these explosions were a relief because they conclusively showed that pure ethylene would not explode and that a flame would not follow the tube into the tank. It has been shown experimentally that a mixture of 10 per cent. ethylene and 90 per cent. oxygen will explode with greater

force than an equal percentage of the two gases; hence greater care should be taken when high percentages of oxygen are being administered. The first operation performed under ethylene-oxygen anesthesia was done by Dr. Arthur Dean Bevan, March 14, 1923.

DR. J. S. HORSLEY, Richmond, Va.: We have been very much interested in a practical way in ethylene. We are quite enthusiastic about it; I feel it is the best general anesthetic. No general anesthetic is perfect. There is, of course, nothing powerful enough to produce unconsciousness that is "fool-proof," and ethylene must be used with a certain amount of discretion. The question of explosibility has been properly emphasized, but it is possible that it may have been exaggerated. If you must have an explosion, why not have an explosion of gas and have it over with, rather than have an explosion with ether, which scatters the liquid in every direction? I believe that since we have been using ethylene, two or three lives have been saved that would not have been saved if the usual general anesthetics had been employed. The cautery can be used under very careful restrictions but never near the head, neck or upper chest.

DR. C. N. CHIPMAN, Washington, D. C.: In regard to the odor of ethylene, there must be a great deal of difference in the way ethylene has been administered. For the last six months I have been using it without nitrous oxid, and the patient does not complain of the odor. We start with a liberal supply of oxygen with the ethylene, and the patients go to sleep so quickly that they do not complain of an offensive odor. If they have had ether before and you ask them if it is better than ether, they say, Yes, a hundred times. When questioned as to whether it is better than nitrous oxid, they say, Yes. They do not have the depressed feeling frequently complained of when taking nitrous oxid. A great many of these patients vomit. My observation has been that the vomiting comes on several hours afterward, especially if these patients have liquids, and people are permitted to talk to them, so I have made this definite rule: They are not permitted to talk; all their friends are kept out of the room, and they are given a pint of salt solution by rectum after they go back to the room. My observations are that ethylene is apparently more of a sedative drug, while ether and nitrous oxid is more or less an exciting drug.

DR. ARNO B. LUCKHARDT, Chicago: Ethylene has not the offensive odor stated by some, nor has it an agreeable odor. I cannot say that there is anything strikingly wonderful about its smell. It is a curious fact that patients fail to complain about it; it is the anesthetists and surgeons that complain. In regard to Dr. Bartlett's statement of taking the gas twice on two successive days: I have taken it three and four times on the same day. The point is this: Whether one likes the smell or not, a few inhalations of dilute ethylene gas promptly destroy the olfactory sense so that subsequently it is odorless to the patient. I am adverse at the present time to the use of a cautery in the operating room. On the basis of data collected, ether vapor is a trifle more explosive than ethylene gas; but I think that any serious accident arising because of the use of a cautery in its presence will militate against its further use, and any sanction thus given will invite adventurers to see what can be done with it in the presence of a free flame or course of electric sparks. So I think for the present it is better not to use the cautery in its presence. Whereas the use of the cautery might be safe at some distance from the actual exhaled ethylene-oxygen mixture, by proper diffusion the proper explosive mixture may surround the cautery and produce a violent and serious accident.

DR. C. D. LEAKE, Madison, Wis.: Following the contribution of Dr. Luckhardt and Dr. Carter, we are to expect a great number of announcements of the discovery and use of more ideal anesthetic agents. According to accounts of Wieland in Germany, acetylene is an efficient anesthetic agent. It may interest you to know that it can be administered in 50 per cent. acetylene and 50 per cent. oxygen. It has been announced by Dr. Halsey and his associates in Louisiana that propylene is a very efficient anesthetic agent and that it may be administered in concentrations of 37 per cent. propylene and the remainder oxygen. I have already suggested, perhaps without any justification, that dimethyl oxid be investigated. The point I wish to make is this: The tests made with regard to ethylene were most careful and rigorous; the work was based on absolutely reliable experimental work before it was given to the medical profession. All the clinical work has been of the most careful and thorough sort. We are therefore standing on a firm basis with regard to ethylene. Of these other agents we know little, and we should pause and insist absolutely that before any other agent is introduced as an anesthetic, it should be subjected to the same rigorous tests that were applied to ethylene.

DR. N. S. HEANEY, Chicago: Ethylene is excellent for the examination of the ambulatory case. One of the men in this room was with me during rounds recently when we questioned twenty-eight patients regarding nausea who had received ethylene alone as an anesthetic. They probably all vomited while recovering from the anesthetic, but only two of the patients remembered that they had done so. The lack of persistent vomiting is of particular importance in cases of heart disease in which straining is a factor of moment. The patient who has been operated on repeatedly is a good judge of the by-effects of an anesthetic. I have a patient at the hospital now who has been operated on eighteen times, and she has a decided preference for ethylene as an anesthetic. I wish particularly to emphasize the necessity of being cautious regarding the explosibility of ethylene. Several members have mentioned that they have used cauteries and have had no explosions. They have been fortunate. In the explosion in Baltimore mentioned in the newspapers some time ago, they ascribed the explosion to the fact that by giving ethylene the patient's stomach became inflated and that afterward this gas was belched up and became ignited through the use of the cautery, though the patient was being operated on under nitrous oxid at the time of the explosion.

DESCENDING ABSCESSES IN THE NECK

DIAGNOSIS AND TREATMENT

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Occasionally, abscesses in the neck show a tendency to descend into the mediastinum. They bore into the loose cellular tissue (deep cervical fascia) of the neck, where they may very readily extend downward into the chest. Unless this descending process is early recognized and the proper treatment instituted, the life of the patient becomes greatly endangered. Laryngoscopic examination offers the only reliable way in which to make an early diagnosis, and for this reason, every case of cervical abscess showing any of the symptoms enumerated below should have a laryngoscopic examination by a competent laryngologist.

These abscesses may originate primarily in the tissues of the neck following acute infections, trauma or the presence of foreign bodies, or secondarily, from suppurative processes higher up, such as infection in and around the tonsillar fossae (following tonsillectomy, peritonsillar abscess), retropharyngeal abscess, abscess at the base of the tongue, or infection about the teeth and in the nasal sinuses.

In order to appreciate the ease with which these abscesses may spread to the mediastinum, a better knowledge of the mediastinum itself and its connection with the cervical region is essential. For this reason I shall try to picture the enveloping fascia of the neck and mediastinum in the way in which I have been in the habit of visualizing it, and which seems very practical from a working standpoint. The heart and other important structures that fill the mediastinal cavity

primarily originate in the embryo in the cervical region, and are later projected downward to their permanent position in the chest. Accordingly, then, let us suppose, that a large sheet representing the fascia of the mediastinum and neck is placed over the upper outlet of the thorax and the heart, and the other structures that occupy the regions of the neck and mediastinum (in their proper relations, of course), are placed on it and forced downward to assume their respective places in the neck and chest. Then, if the sheet is gathered up with all its folds and fastened to the head at a border continuous with the lower jaw, mastoid and occipital protuberance, and the upper part then trimmed away, one would have a good practical working knowledge of the connections of these regions. No mention is made of the topographic relations of the various organs in these regions because such a discussion is not in the scope of a paper of this sort, and, if one is sufficiently interested, it can always be found in the standard works on this subject. However, from the foregoing description, it can more readily be seen how easily pus in the neck beneath this fascia can descend into the mediastinum.

Regardless of the origin of these descending abscesses, the treatment is the same in all cases; viz., drainage of the abscess and sealing of the mediastinal spaces. This is best accomplished by the prophylactic mediastinotomy operation of Marschick as performed in the Hajek clinic (Vienna), which I had the opportunity to observe during my recent studies there. Briefly, the operation is as follows:

An incision is made through the skin of the neck along the anterior border of the sternocleidomastoid muscle, extending from the lower border of the mastoid tip to the sternum. Occasionally, the swelling and induration may be so great that it is not possible to locate accurately the border of this muscle. In such cases, I have found that it is better, when there is any doubt at all in the mind of the operator regarding the border of the muscle, to place the incision well enough forward so as to be absolutely sure of coming down in front of the anterior border. It has been my experience that if the incision should come down on top of the muscle, it will complicate the remainder of the operation; and it is very essential that the operator know at all times what structures will be encountered, since there are so many of vital importance in this region.

The next step is to locate and seal the mediastinal spaces. Beginning at the bottom end of the incision, by blunt dissection one proceeds inward through the superficial fascia along the side of the anterior border of the sternocleidomastoid muscle until the vascular sheath is reached. This is the anterior collar mediastinum and should be tamponed with a strip of iodoform gauze. In order to proceed farther inward, it now becomes necessary to extend the blunt dissection upward. The omohyoid muscle will now be encountered above, running obliquely across the incision from above downward. This muscle must be recognized and severed; then, by gently lifting the thyroid forward with blunt retractor, the posterior collar mediastinum is reached. The index finger may now be inserted until the cervical vertebrae are encountered. An iodoform gauze strip is now inserted into this space and this area tamponed. This tamponing of the mediastinal spaces is always done first, regardless of whether pus is encountered or not. If pus is encountered, the tampons will act as a drain to the infected mediastinum. If not, they will cause it to be walled off against further downward progress of the pus. After this has been accomplished, the original source in the upper part of the incision must be sought, and it is at this point that a laryngoscopic examination becomes most helpful. A well taken history will also help to determine the source, and the laryngoscopic examination helps to determine the location by the presence of the bulging of the abscess.

The course followed in locating the abscess will always differ with each individual case, according to its origin. Blunt dissection should be the rule in this region. However, it may become necessary, on account of the induration, to sever some of the tissues with the knife or scissors; but this should never be undertaken unless the operator is absolutely certain of the tissues about to be cut. When the original abscess is encountered a wick of gauze is placed in it, but not packed, and the wound left entirely open. A dressing is placed on the wound and is kept moist and changed daily. After four or five days, the tampons from the mediastinum are removed and replaced by a small wick of gauze. The wicks are changed at each dressing and shortened each time, as progress would indicate, until they can be left out altogether.

A review of the literature on this subject seems to show some difference of opinion regarding the indication for the prophylactic mediastinotomy operation. The ones which seem to be most generally accepted are as follows:

1. Rapid progress of the inflammatory swelling, with redness extending down over the clavicle.
2. Unrest, slight stupefaction.
3. Septic pulse and temperature.
4. Marked sensitiveness to pressure over the large vessels of the neck down to the clavicle, and plastic inflammation of the soft parts of the neck.
5. Edema of the larynx.
6. Bulging into the larynx, pyriform sinuses, or trachea.

As has been said above, laryngoscopic examination offers the only reliable way in which to make an early diagnosis, and I believe that this operation should be done in any case showing the two latter symptoms. At any rate, I have considered the presence or absence of these two symptoms as the deciding factors for or against the operation in the cases reported below. However, I have noticed in literature the report of some cases in which operation was performed and neither of these two symptoms were present. Cases 1, 4, and 5 show the importance of these symptoms and the necessity for this operation. Cases 2 and 3 show the importance of the absence of these two symptoms. At the same time, all the cases reported show a vital necessity for the laryngoscopic examination of all cases of abscesses in the neck showing any one, or all, of the first four symptoms mentioned.

REPORT OF CASES

Case 1.—J. S., aged 38, a cowboy, complained of painful swelling in the jaw and neck, and difficulty in swallowing. Six weeks previous, a wheat beard that became lodged in his throat he was unable to extract. Since that time the trouble had gradually developed.

Examination with the direct laryngoscope showed a bulging into the left pyriform sinus and edema of the left arytenoid. The temperature was 102.4 F., the pulse 94. The patient refused a prophylactic collar mediastinotomy operation, and the abscess was opened and drained without sealing off the mediastinum. He was advised to keep the dressing moist and return on the next day. He did not return until nine days later, at which time the swelling had extended well down to the front of the chest and the bulging in the left pyriform sinus was more marked than at first. The entire larynx was edematous. The temperature was 103 F., the pulse 120. There was a definite history of chills during the previous three days. A collar mediastinotomy operation was done at this time. A large quantity of pus was evacuated from the neck and mediastinal region. The next day the patient complained of a pain in the left eye. Examination showed a beginning iritis. Two days later an acute nephritis

developed with suppression of the urine, and death followed on the fifth day following the operation. Postmortem was refused, but permission was obtained to insert a trocar into the mediastinum, which revealed the presence of pus under pressure.

CASE 2.—M. D., aged 26 months, had a swelling in the neck near the angle of the jaw. The family physician diagnosed mumps. Two weeks later the patient was brought to me because the swelling and redness had extended well down the neck and on the chest. Where the swelling first appeared, the abscess seemed to be coming to a focus. The temperature by rectum was 104.5 F. The respirations were rapid, and the patient was greatly prostrated. Laryngoscopic examination by the direct method failed to reveal any bulging, and there was no redness nor edema of the larynx. Hence, it was decided to open the abscess at the angle of the jaw only. About an ounce of bloody pus was evacuated, and in this pus was found a feather about 1 inch long. Recovery was prompt and uneventful. In twenty-four hours the redness and swelling, which had extended down on the chest at the time of operation, had almost completely disappeared. The feather evidently came from the patient's pillow, lodged in the throat, and then worked its way into the parapharyngeal space, giving rise to the abscess.

CASE 3.—W. S., a man, aged 30, a farmer, was referred by the family physician on account of pain and tenderness in the neck, just under the ear, which was greatly aggravated by movements of the jaw. Six weeks before, while he was running a corn sheller, an ear of corn flew out and struck him on the jaw just in front of the lower part of the ear, knocking him down, but he did not lose consciousness. The symptoms came on following this accident, and gradually grew worse. Entire examination at this time, except for the pain and tenderness, was negative, including a roentgen-ray examination of the jaw and the teeth in this region. The patient was advised to return to his home in the country under the care of his family physician and to await developments.

The pain grew very much worse in the next few days, and it became so excruciating that one-half grain (0.03 gm.) of morphin (two one-fourth grain doses) given him in a period of three hours did not control it. On the fifth day he returned again with redness and swelling extending down on the chest, with great pain and tenderness along the region of the large vessels of the neck clear down to the clavicle. Laryngoscopic examination at this time was negative, but a bulging in the pharynx (not in the larynx) just back of the tonsil and posterior pillar, about on a level with the lobe of the ear, could easily be made out. I hesitated to open the abscess at this site for fear of strangulation from the pus, so I made an incision through the anterior pillar, and with a blunt instrument proceeded cautiously backward until the pus was located. The patient was kept in the hospital over night, preparatory to a collar mediastinotomy operation the next day if necessary. On the next day there was a marked amelioration of all symptoms, including a decided recession of swelling and redness of neck, and recovery followed without further surgical intervention. Four months later he still had some ankylosis of the jaw.

CASE 4.—E. F., a man, aged 24, a farmer, complained of a swelling and tenderness on the left side of his neck, which extended well down on the chest. Four weeks previous, he had had an attack of tonsillitis, which ended in quinsy. The quinsy ruptured and improvement followed until about a week before he consulted me, when the soreness again returned on the left side of the neck. About four days later, the family physician attempted to open the abscess by skin incision on the side of the neck, thinking it was a suppurating gland. No improvement followed this, and he was referred to me for further treatment.

Examination showed a marked swelling and redness of the neck on the left side, extending well down on the chest. The redness extended farther down on the chest than did the swelling. The neck was very tender to pressure, and palpation showed a marked fluctuation just below and posterior to the angle of the jaw. Exan ination of the larynx with a direct laryngoscope showed a marked bulging inward of the left pyriform sinus and a translucent edema of the arytenoids. A collar mediastinotomy operation was done, and the patient made an uneventful and rapid recovery.

CASE 5.—F. H., a man, aged 24, a farmer, was referred to me, Dec. 15, 1923, on account of obstructed breathing and swelling of the front part of the neck. He had had recurring attacks of hoarseness for a year, following an attack of influenza, but up to the time of consulting me they had never been very severe. One week previous, following an exposure, the neck began to swell and the symptoms of obstructed breathing set in. The patient did not complain of any other ailment except obstructed breathing, hoarseness, swelling, and tenderness in the front part of the neck.

External examination showed the neck to be quite swollen and hard, chiefly in the region of the isthmus of the thyroid. The swelling had a boardlike feeling, and there was a moderate amount of tenderness. The temperature was 99.5 F.; the pulse, 140. There was a fine tremor of the hands. Laryngeal examination showed the arytenoids normal, and there were some dilated veins in both pyriform sinuses. There was a bulging of the upper end of the trachea inward on the right side, immediately under the larynx. The upper surface of this showed a shallow ulceration, irregular in outline, about 4 mm. wide and 6 mm. long, and covered by a grayish sort of secretion. This obstruction extended inward about three fourths of the way across the trachea, leaving only a small half-moon shaped area on the left side of the larynx through which he could breathe. There was no paralysis of the cords.

The diagnosis was inflammation of the tissues of the neck, with abscess formation. There was also a great possibility of an involvement of the thyroid, which was indicated by the rapid pulse, fine tremor of the hands, and a fever of only 99.5 F.

The patient was referred to me by a general surgeon for examination only. The patient refused the treatment that I prescribed, and three days later was operated on by local incision and drainage, and I heard no more of him until some weeks later, when the father appeared in my office asking me to hurry to the hospital immediately to look after his son. Before I could reach the hospital, the patient had died. He had walked into the hospital from the street and to his room, where he undressed and got in bed waiting for me to come. All this time he was suffering from a marked obstruction of respiration. When he had been in bed about twenty minutes, the nurse's attention was attracted by a sort of gurgling sound that he was making, and he immediately died, apparently from strangulation as a result of an abscess rupturing into the trachea.

Postmortem examination was refused, so the cause of death could not definitely be ascertained. However, in view of the findings at the time of the examination and the history of the case from that time on until death, I feel that this case was also one of an abscess in the neck which should have been treated by the prophylactic collar mediastinotomy operation, and I have reported it only for the purpose of emphasizing the importance of the laryngologic findings on these cases.

COMMENT

I would emphasize the prudence of a thorough examination of the larynx in all cases of abscess of the neck showing any of the first four symptoms mentioned above. If either of the two latter symptoms is found, a collar mediastinotomy operation should immediately be done. If absent, unless the condition of the patient will not permit delay, local incision and drainage may be tried. Unless, however, immediate improvement should follow, the mediastinum should be opened and sealed.

SUMMARY

My method of handling these cases is as follows:

1. The history is carefully taken to determine, if possible, the source of the infection.
2. The larynx is examined.

3. If no edema nor bulging is found, and the condition of the patient will warrant, the abscess is opened locally and drained.

4. If insufficient or no improvement follows in from twelve to thirty-six hours, the anterior and posterior collar mediastinum is then opened and sealed.

5. If edema or bulging is seen in the larynx, or if the condition of the patient indicates a general septic condition, the immediate opening and sealing of the collar mediastinal spaces is advised.

PERINEPHRITIC ABSCESS *

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Infection and inflammatory reaction in the perirenal tissues is a common finding at operation and at necropsy. However, true abscess formation in this area is uncommon, and its symptoms are usually so vague and difficult to interpret that the possibility of it must always be borne in mind in order to insure a successful termination.

While the classification of perinephritic abscesses as primary or secondary has been universally accepted, a review of the cases reported in the literature, and of cases observed in the Mayo Clinic on which such classification is based, fails to disclose a single instance in which primary infection of the perirenal tissues resulted in abscess formation, independent of primary renal or extrarenal infection. The classification of perinephritic abscesses on an etiologic basis furnishes a most adequate method for their consideration. Such abscesses are either of renal or extrarenal origin. Those of renal origin are caused, in order of frequency, by pyonephrosis, lithiasis, tuberculosis, and traumatic rupture of the kidney. Those of extrarenal origin are metastatic, or occur by direct extension. Abundant experimental and clinical evidence supports the theory of metastatic extrarenal infection through the lymphatic and hematogenous pathways. Miller [1] has reviewed the lymphatic circulation of the perirenal tissues and its intimate communication with the retroperitoneal lymphatics, designating direct pathways by which infection from the lower urinary tract and genitalia may result in perinephritic infection and abscess without involvement of the kidney. However, in none of the cases reported by him, except three in which he believed the source of infection was pelvic, could such a metastatic pathway satisfactorily explain the method of extension to the perinephritic tissues. Clinical support of his contentions is afforded by one of Jordan's [2] cases, in which the perinephritic abscess followed acute orchitis, and by one of Jaffé's [3] cases which followed acute gonorrhea. Gautron [4] likewise emphasizes the importance of the lymphatic circulation as a means of metastasis to the perirenal tissues in the development of perinephritic abscess post partum. In Horsley's [5] report of three cases following parturition, attention is directed to the free communication between the perirenal and retroperitoneal lymphatics. However, conditions post partum may not be unlike those of the earlier months of pregnancy, or those immediately following abortion, in which Murphy,[6] reporting a case, asserted that the perinephritic abscess was probably embolic in origin. While the lymphatics offer a means of extension from the pelvis and genito-urinary organs to the perinephritic tissues, the hematogenous method of extension cannot be excluded.

Brewer,[7] from his experimental data and clinical experience, concludes that during the progress of any acute infectious disease, a certain number of microorganisms find their way into the blood current, and that many are excreted through the kidneys. If the number of these organisms is comparatively small, if their virulence is low, and if the kidneys are in a healthy condition, their transit through the renal apparatus gives rise to no demonstrable lesion. On the other hand, if the number of the organisms is large and their virulence high, or if one or both kidneys are diseased, lesions are produced which may go on to the development of any of the types of renal infection or suppuration. Brewer concludes, further, that hematogenous infection is responsible for the greater number of cases of renal sepsis, and that, even in septic conditions of the lower urinary passages, the concomitant renal lesion may be of hematogenous origin. The first of his conclusions is supported by the fact that a large number of perinephritic abscesses occur subsequent to an acute virulent peripheral infection in which lymphatic metastasis can be excluded.

Direct extension to the perinephritic tissue, independent of renal involvement, rarely occurs from a subdiaphragmatic abscess, appendical abscess, or empyema. One of Harzbecker's [8] cases was secondary to empyema, which probably is a more common cause than has been reported. The incidence of perinephritic abscess secondary to renal disease varies widely. Miller,[1] in 1909, in a series of thirty-six cases, found definite evidence of primary renal disease in only four. Braasch,[9] in 1915, reported 56.4 per cent. of sixty-seven cases of perinephritic abscess as secondary to primary renal disease, and in 30 per cent. of Richardson's [10] cases, there was definite primary disease of the kidney.

A recent review of the cases of perinephritic abscess in which operation was performed at the Mayo Clinic between Jan. 1, 1914, and Jan. 1, 1924, maintains the high incidence of primary renal disease formerly noted by Braasch. Of the 106 cases, nineteen (18 per cent.) were secondary to pyonephrosis; twelve (11.3 per cent.), to lithiasis; ten (9.4 per cent.), to tuberculosis; one, to infected hypernephroma, and five (4.7 per cent.), to traumatic rupture of the kidney, a total of forty-seven (44.3 per cent.) secondary to primary renal disease. While such conditions are the cause of a high percentage of perinephritic abscess, the incidence of perinephritic abscess is low. During the ten-year period in which these cases were observed, abscesses occurred in but nineteen (2.5 per cent.) of 742 nephrectomies for pyonephrosis and infected hydronephrosis, in twelve (1 per cent.) of 1,234 cases of renal lithiasis, and in ten (1.5 per cent.) of 644 nephrec-

* From the Division of Surgery, Mayo Clinic.
* Read before the Section on Urology at the Seventy-Fifth Annual Session of the American Medical Association, Chicago, June, 1924.

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9. Braasch, W. F.: Perinephritic Abscesses, Surg., Gynec. & Obst. 21: 631-635, 1915.
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tomies for renal tuberculosis. Pyelonephritis is another possible renal lesion not included in the foregoing. While Cumston [11] regards the pyelonephritis of pregnancy as an important etiologic factor in the development of perinephritic abscess, Braasch, in 1915, in 211 cases of pyelonephritis and pyelitis did not find a case of perinephritic abscess.

Cortical abscess is probably the most common cause of perinephritic abscess. By exclusion of the renal lesions known to cause perinephritic abscess, its incidence may be determined. The experimental work of Brewer and others, as well as Rosenow's [12] work on the specificity of organisms, quite definitely establishes cortical abscess on a hematogenous etiologic basis. Clinical support of such a conclusion is the high incidence of perinephritic abscess following the peripheral infections. Israel,[13] Jordan,[2] Coenen,[14] Jaffé,[3] Albrecht,[15] and many others have called attention to the frequency with which superficial infections precede perinephritic abscess. In six of Rehn's [16] nine cases there was peripheral infection, and in fourteen of Harzbecker's [5] thirty-two cases the condition was preceded by similar infections. Richardson [10] collected 108 cases reported to be due to metastatic infection, in thirty-three of which the perinephritic abscess was apparently an extension of a cortical renal abscess. In 100 of these cases the perirenal suppuration was preceded by furuncles, carbuncles, paronychiae, local abscesses, acute tonsillitis and septic wounds. A recent partial review of the literature has disclosed 160 cases of perinephritic abscess, in eighty-five of which there was a preceding peripheral infection, consisting of furuncles, carbuncles and paronychiae. Parotitis, tonsillitis, septic endocarditis and local abscesses were rare. It has been proved that cortical abscess may follow superficial infections; and that it causes perinephritic abscess is supported by surgical and necropsy evidence.

In fifty-nine (55.7 per cent.) of the 106 cases of perinephritic abscess observed in the Mayo Clinic during the last ten years there was an absence of apparent or demonstrable primary renal lesions. In five of these, single or multiple cortical abscesses were found in kidneys so badly diseased as to require primary nephrectomy at the time of evacuation of the perinephritic abscess. In none was the lesion pyonephrosis, tuberculosis or the result of lithiasis. In twenty-six cases in which simple drainage was instituted, exploration of the kidney revealed the perinephritic abscess in direct communication with a cortical abscess. In the remaining twenty-eight cases of perinephritic abscess of extrarenal origin, for various reasons, the kidney was not explored at the time of primary drainage, and its condition was unknown. However, the recovery of the patients after simple drainage, and the absence of symptoms referable to the kidney, are evidence that the source of the trouble was a cortical abscess. At least the observation of the presence of cortical abscess in all cases in which examination of the kidney was made (52.5 per cent. of those of extrarenal origin), would strongly suggest that cortical abscesses were present in all cases.

In many of the cases reported in the literature, the exact lesion and its cause were unknown. That cortical abscesses, single or multiple, form an important surgical lesion of the kidney is indicated by the fact that 179 (9.7 per cent.) of the 1,835 nephrectomies performed at the Mayo Clinic during the last ten years were undertaken because of cortical abscess.

Bilateral renal infection of metastatic origin, of which Kretschmer [17] reported an instance proved at operation and necropsy, probably occurs frequently. However, bilateral perinephritic abscess is exceedingly uncommon. In a review of the literature, I have found nine cases (Harzbecker,[5] six; Piltz,[18] one; Maass,[19] one, and Cope,[20] one); a case reported here from the Mayo Clinic adds one to the list. Ritchie [21] has recently observed an instance of bilateral perinephritic abscess not yet reported, but by his permission abstracted as follows:

> A man, aged 22, had noticed progressive weakness, loss of appetite, and pain in the back for two and one-half months before coming under observation. He had fallen, striking on his back, ten months before, and had not been well since. He was emaciated, weighing but 84 pounds (38 kg.). Repeated urinalysis was negative. In each costovertebral angle there were marked tenderness and rigidity, and there was a definite mass on the right side. Roentgen-ray examination of the spine was negative. On the diagnosis of bilateral perinephritic abscess, bilateral drainage was instituted and a large amount of pus evacuated from the right side. The patient recovered completely in three months.

While perinephritic abscess is reported to be more common on the right side, chiefly because of the relatively low position of the kidney, it would seem that only through injury might the right kidney be more susceptible to the formation of perinephritic abscess than the left. Three of the five cases of perinephritic abscess due to traumatic rupture in this series occurred on the right side. Of the entire series, fifty-five occurred on the right side, fifty on the left side, and one was bilateral. Seventy of the patients were males and thirty-six were females.

DIAGNOSIS

The successful termination of perinephritic abscess is dependent on early diagnosis and operation. The methods of examination of the urinary tract readily reveal the primary renal lesions predisposing to perinephritic abscess. However, the extrarenal types of perinephritic abscess often present symptoms so vague and difficult of interpretation that marked renal damage and general sepsis may supervene before its true nature has been determined.

In cases of primary organic lesions of the kidney, such as pyonephrosis, lithiasis and tuberculosis, the urinalysis usually discloses microscopic evidence which leads to investigation of the urinary tract. However, a strikingly uniform observation has been the absence, in most cases, of microscopic elements in the urine if the cortical abscess was extrarenal in origin. Not until the cortical abscess communicates with the calices or pelvis do pus or blood cells appear in the urine. If the cortical abscess is small and does not communicate with the pelvis or calices, pyelography may reveal, in the presence of perinephritic abscess, insufficient change

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13. Israel, quoted by Albrecht (Footnote 15).
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16. Rehn, L.: Ueber die Frühdiagnose und Frühoperation der metastatischen Eiterung in der Nierenfettkapsel, Beitr. z. klin. Chir. **73**: 1-33, 1911.
17. Kretschmer, H. L.: Carbuncle of the Kidney, J. Urol. **8**: 137-148. (Aug.) 1922.
18. Piltz: Ein Fall von doppelseitigen paranephritischen Abszess, München. med. Wchnschr. **49**: 1654, 1902.
19. Maass, H.: Zur Kasuistik der genuinen Eiterungen der Nierenfettkapsel, Ztschr. f. Urolog. Chir. **12**: 90-95 (March) 1923.
20. Cope, V. Z.: Subacute Perinephritic Abscess of Nonrenal Origin, Brit. M. J. **2**: 509-511 (Oct. 2) 1920.
21. Ritchie, H.: Personal communication to the author.

in the pelvic outline to be of diagnostic value, and result, in a few instances, in a diagnosis of extrarenal tumor. The renal functional tests are of materially less assistance in cases of perinephritic abscess of extrarenal origin than in those of primary renal origin, and it may be difficult, because of vague localizing symptoms, to make a diagnosis on clinical examination. Much attention has been directed to the point of tenderness in the costovertebral angle, which usually is elicited. However, in the presence of an abscess about the upper pole of a high lying kidney it may be absent (Case 1). With the development of a tumor in either renal area, the diagnosis is suggested. The early diagnosis of perinephritic abscess of extrarenal origin embraces the consideration of all causes of high fever, leukocytosis and general sepsis. However, the recognition of the relationship of peripheral infection to perinephritic abscess may call early attention to the possibility of such a condition, if clinical examination or the history discloses a preceding infection. To facilitate early diagnosis, it is important that the definite relationship between preexisting or concomitant furuncles, carbuncles, paronychiae and peripheral infections be borne in mind.

Pulmonary complications occur sufficiently often in cases of metastatic perinephritic abscess to mask its clinical manifestations, to explain the symptoms, and to conceal the underlying cause. In thirteen of Miller's twenty-six cases, there were pulmonary complications. In three of the cases of metastatic perinephritic abscess, reported here, pulmonary complications were noted; in one they simulated bronchopneumonia, in one pleurisy was present, and in the third, a bilateral case, clinical evidence supported by necropsy findings, of terminal multiple pulmonary abscesses.

PROGNOSIS

The seriousness of perinephritic abscess is dependent on its etiology, and the time relation between its onset and the institution of treatment. Küster's [22] mortality rate was 34 per cent.; that of Miller, 14.3 per cent. In the Mayo Clinic series there were seven hospital deaths (6.6 per cent.; Table 1). Twelve patients died

TABLE 1.—*Hospital Deaths*

Case	Lesion	Operation	Day of Death	Clinical Cause	Findings
12	Cortical abscess	Drainage	22	Pneumonia	Pneumonia
13	Pyonephrosis	Primary nephrectomy	2	Pneumonia	Bilateral pneumonia
14	Renal lithiasis	Drainage	30	Renal insufficiency	Bilateral pyonephrosis
15	Cortical abscess	Drainage	10	General sepsis	Mediastinal abscess and right hemothorax
16	Renal tuberculosis	Secondary nephrectomy	15	General sepsis	
2	Metastasis	Drainage	16	General sepsis	Bilateral cortical renal abscess; multiple abscesses of lung
17	Traumatic rupture	Primary nephrectomy	19	Secondary hemorrhage	Carcinoma of right kidney; metastasis to lungs and liver

from one month to five years after operation, giving a total mortality rate of 17.9 per cent. up to five years after operation (Table 2). Of the nineteen patients who died, seven had perinephritic abscess secondary to renal tuberculosis, seven had proved or presumed cortical abscess, two had pyonephrosis, one was secondary to nephrolithiasis, one was secondary to traumatic rupture, and one was a metastatic abscess. Of the twelve patients who died from one month to five years after operation, four had had primary nephrectomy, one secondary nephrectomy, and one drainage for perinephritic abscess associated with renal tuberculosis. Four had had primary nephrectomy, and one simple drainage for abscess associated with renal cortical abscess, and one had had primary nephrectomy for pyonephrosis. Experience has shown that the prognosis of perinephritic abscess associated with renal tuberculosis and renal cortical abscesses is less favorable than other types of perinephritic suppuration.

TABLE 2.—*Deaths from One Month to Five Years Postoperatively*

Case	Lesion	Operation	Length of Life Postoperatively	Cause of Death
18	Cortical abscess	Drainage	4⅝ years	Influenza
19	Pyonephrosis	Primary nephrectomy	3 years	?
20	Cortical abscess	Drainage	1 year	?
21	Renal tuberculosis	Primary nephrectomy	5 years	?
22	Cortical abscess	Drainage	1 month	Pneumonia
23	Cortical abscess	Drainage	5 years	Carcinoma of stomach
24	Cortical abscess	Primary nephrectomy	10 months	Uremia
25	Renal tuberculosis	Primary nephrectomy	2½ years	Nephritis
26	Renal tuberculosis	Primary nephrectomy	4 years	Generalized tuberculosis
27	Renal tuberculosis	Drainage	3 months	?
28	Renal tuberculosis	Primary nephrectomy	?	?
29	Renal tuberculosis	Secondary nephrectomy	3¼ years	?

The immediate and remote mortality rate of metastatic perinephritic abscess bears a direct relationship to early recognition and early drainage. Prolonged metastatic suppuration results in general sepsis with terminal, generalized infection (Case 2).

TREATMENT

Early drainage of perinephritic abscess with primary or secondary nephrectomy insures the best ultimate results when the condition is associated with renal

TABLE 3.—*Diagnosis and Treatment*

Lesion	Cases	Drainage	Nephrectomy	
			Primary	Secondary
Cortical abscess	48	44	4	...
Pyonephrosis	19	6	13	6
Renal lithiasis	12	10	2	..
Metastasis	11	10	1	..
Renal tuberculosis	10	4	6	3
Ruptured kidney	5	2	3	2
Hypernephroma	1	..	1	..
Total	106	76	30	11

tuberculosis, pyonephrosis with or without stones, traumatic rupture, and multiple cortical abscesses with destruction of the major portion of the kidney. The choice of a primary or a secondary operation is largely dependent on the condition of the patient. Simple primary drainage often reduces the risk of later nephrectomy, even though the latter is rendered technically more difficult. Abscess secondary to renal lithiasis with little renal damage usually responds to simple drainage with the removal of stone. Few cases of perinephritic abscess, metastatic in origin, or secondary to single cortical abscesses, require more than simple drainage (Table 3).

RESULTS

Bronchopneumonia was a predominating cause of the seven deaths occurring in the hospital. Of the deaths occurring from one month to five years after operation,

22. Küster, quoted by Miller (Footnote 1).

the cause was ascertained in only six. The subsequent course was ascertained in forty-nine of the remaining cases. One case of metastatic perinephritic abscess (Case 3) required secondary drainage of the abscess four months later. In none of the cases of cortical abscess, renal lithiasis or metastatic abscess in which simple drainage of the abscess was done was subsequent nephrectomy necessary to complete recovery. The general condition of all the patients from whom information was received is good, with the exception of two of the three living patients who had had abscess associated with renal tuberculosis.

REPORT OF CASES OF METASTATIC ABSCESSES AT THE MAYO CLINIC

CASE 1.—A man, aged 29, had been perfectly well until June, 1923, when a series of carbuncles developed on the buttocks. These continued until September, when a large carbuncle appeared on the left buttock accompanied with marked systemic reaction. After incision, it gradually subsided. September 25, the patient developed persistent dull aching pain in the right costovertebral angle with chills and daily fever of a septic type, ranging from 99 F. in the morning to as high as 103 in the evening. General physical examination and laboratory studies, including blood culture, failed to disclose the cause of illness. The leukocyte count ranged from 9,000 to 23,200. On admission to the clinic, Oct. 26, 1923, the pain in the right costovertebral angle persisted, but was not associated with localized tenderness. The carbuncle was practically healed. The examination was negative except for the general appearance of sepsis. The temperature was 101.2, and the pulse rate 140. The hemoglobin was 60 per cent., and there were 3,420,000 erythrocytes and 23,200 leukocytes, of which 90 per cent. were polymorphonuclears. On the basis of the localized pain, general sepsis and the well known sequence of possible cortical abscesses of the kidney following superficial skin infections, a tentative diagnosis of right perinephritic abscess was established and exploration recommended.

At exploration, a large perinephritic abscess containing fully a pint of thick, creamy pus was found originating from a cortical abscess of the upper pole. Before operation, a small amount of blood-tinged sputum had been expectorated; this persisted for several days following the operation, and with the clinical and roentgen-ray findings in the chest, indicated beginning extension through to the base of the right lung. The temperature at no time after operation rose above 100. An interesting side light is the slow reduction in leukocytes to 26,600 on the seventh day, and gradually subsiding to normal during the following week. Convalescence was uneventful, and the patient was dismissed at the end of the third week. In three months, he had completely recovered.

CASE 2.—A man, aged 39, had been perfectly well until Aug. 28, 1923, when infection of the ring finger of the right hand developed, accompanied by a septic type of temperature. Although incision and drainage had been instituted many times, the picture of general sepsis continued and, about November 1, was accompanied by chills. Amputation of the finger was resorted to, November 2, with subsidence of chills, but the septic temperature continued until November 20, when pain developed high in the right part of the abdomen, followed in a few days by high left abdominal pain, which continued constantly until the patient's admission to the clinic, December 23.

The patient was emaciated and appeared septic; his temperature was 102. There was a huge tender mass, bulging posteriorly, in the region of each kidney. A twelve-hour specimen of urine amounted to 800 c.c., and contained a trace of albumin, a few erythrocytes and pus cells; the specific gravity was 1.013. The hemoglobin was 30 per cent.; the erythrocytes numbered 2,550,000, and the leukocytes 18,700, of which 82 per cent. were polymorphonuclears. The combined phenolsulphonephthalein test showed a return of 40 per cent. in two hours, and there were 40 mg. of urea for each 100 c.c. of blood. Roentgen-ray examination of the chest disclosed an area of consolidation at the right base. A diagnosis of bilateral perinephritic abscess was made and drainage posteriorly instituted December 26, when a quart of pus was drained from the left side and a pint from the right.

The patient's general condition was so poor, and general sepsis so marked, that drainage affected the progressive course very little. Dissemination of the pulmonary infection progressed, and death occurred, January 11, or seventeen days after operation. Necropsy disclosed bilateral cortical abscesses, with extension of the perinephritic abscesses to the peritoneal cavity, localized peritonitis, and multiple abscesses of the lungs.

CASE 3.—A man, aged 27, seven months before coming to the clinic, had rather suddenly developed pain in the right costovertebral angle, following a series of boils on the leg and face. Chills and fever had occurred daily for six weeks, at times so severe as to require morphin for relief. The patient had lost 30 pounds (13.6 kg.). For a short time, he had had pain in the right lower chest, and for several days cough had produced bloody sputum. The pain in the right costovertebral angle had persisted, with daily fever as high as 102. There were practically no urinary symptoms.

On the patient's admission to the clinic, Jan. 16, 1923, he was moderately emaciated and appeared anemic; his temperature was 99.2. General physical examination was negative except for rigidity of the abdominal muscles high on the right side and a palpable tender mass in the region of the right kidney. Urinalysis disclosed erythrocytes 2 and pus cells 2. The hemoglobin was 59 per cent., and there were 4,530,000 erythrocytes and 16,500 leukocytes. A combined phenolsulphonephthalein test brought a return of 55 per cent. in two hours. Roentgen-ray examination of the chest disclosed a thickened pleura around the base of the right lung. A tentative diagnosis of right perinephritic abscess was made, and exploration advised.

Drainage of a right perinephritic abscess was established through a posterior incision. The patient's convalescence was satisfactory, and three weeks later he was dismissed from observation. Four months later a drainage was again necessary, after which the wound healed completely.

CASE 4.—A man, aged 49, nine weeks previous to admission to the clinic had developed an abscess of the left thigh, which broke down and drained after two weeks. Three weeks after the onset of the abscess, severe pain, more or less constant, with radiation to the right leg, developed in the right costovertebral area. He had lost 20 pounds (9 kg.) in nine weeks.

At the time of his examination, Nov. 29, 1922, there was a large, tender mass in the right lumbar area, bulging posteriorly, and extending down to the crest of the ilium anteriorly. The urinalysis disclosed a few hyaline and granular casts and a very few pus cells. There was a leukocytosis of 25,000. The condition was obviously a large perinephritic abscess, and it was drained immediately. The patient's convalescence was satisfactory, and he was dismissed from observation at the end of four weeks.

CASE 5.—A man, aged 25, had developed so-called sties and a few boils on the neck about three months before coming to the clinic. Five weeks before, pain developed in the left costovertebral area, accompanied by slight urinary frequency. He had lost 12 pounds (5.4 kg.).

At the time of the patient's admission to the clinic, Jan. 17, 1921, his temperature was 100. There was a tender mass in the region of the left kidney, extending to the crest of the ilium. Examination of the chest disclosed a few râles at the left base.

Drainage of a left perinephritic abscess was instituted. The patient convalesced satisfactorily, and was dismissed from observation at the end of two weeks.

CASE 6.—A woman, aged 34, came to the clinic, Jan. 1, 1920. Three months before, she had had a series of boils on the back of the head, and a carbuncle on the back, unaccompanied by chills or fever. The carbuncle was opened widely and curetted. Two weeks before admission, pain had developed in the right costovertebral angle, and was accompanied by fever (103) and marked tenderness. There were no urinary symptoms.

On admission, the patient's temperature was 101.5. She was considerably emaciated and very weak. There was a large, tender mass in the upper right quadrant of the abdomen, extending through to the lumbar area. The hemoglobin was 45 per cent.; erythrocytes numbered 3,330,000, and leukocytes 26,200, of which 82 per cent. were polymorphonuclears. The combined phenolsulphonephthalein test showed a return of 55 per cent. of the dye in two hours. Cystoscopic examination disclosed right pyonephrosis. At operation, pyonephrosis with a huge perinephritic abscess was found, and primary nephrectomy and drainage were performed. Pathologic examination revealed multiple cortical abscesses. Convalescence was uneventful, and the patient was dismissed at the end of three weeks. Three years later, the patient was in excellent health.

in the left side of the back, and had continued so severe that the patient could not straighten up. For the first few weeks, there was much weakness and loss of weight; later, frequency developed. Four weeks before admission, the patient had noticed a mass in the region of the left kidney.

On admission, Dec. 31, 1915, the patient appeared very ill, and there was a large, tender mass in the region of the left kidney. Urinalysis revealed only a very few pus cells. There was marked secondary anemia; the hemoglobin was 35 per cent.; erythrocytes numbered 3,630,000, and leukocytes 24,400, of which 84 per cent. were polymorphonuclears. A large left perinephritic abscess was drained, and the patient was dismissed four weeks later.

Case 11.—A man, aged 63, had had a series of boils on the back of his neck three months before admission. About four

Table 4.—*Metastatic Abscesses: Mayo Clinic Cases*

Case	Age, Yrs.	Sex*	Location	Lesion	Duration Wks.	Duration Mos.	Fever	Leukocytes	Hemoglobin, per Cent.	Urine	Phenolsulphonephthalein, per Cent.	Pulmonary Complications	Tenderness	Tumor	Operation	Result
1	29	♂	Right	Carbuncle	...	2	99 to 100	25,200 to 28,200	60	Normal	?	+	0	0	Drainage	Recovery
2	39	♂	Bilateral	Infection of finger	...	4	100 to 102	18,700	30	Few red and pus cells	60	+	+	+	Drainage	Death
3	27	♂	Right	Boils	...	7	102	16,500	50	Red cells and pus ?	55	+	+	+	Drainage	Recovery
4	49	♂	Right	Abscess of thigh	9	...	...	25,000	..	Few pus cells	..	0	+	+	Drainage	Recovery
5	25	♂	Left	Boils	...	2	100	.....	..	Normal	..	0	+	+	Drainage	Recovery
6	34	♂	Right	Carbuncle	...	2	102	28,200	65	Pus ?	55	0	+	+	Nephrectomy	Recovery
7	48	♂	Left	Boils	5	...	105	14,600	..	Few pus cells	45	0	+	+	Drainage	Recovery
8	14	♀	Right	Acute tonsillitis	...	2	...	.....	..	Normal	..	0	+	+	Drainage	Recovery
9	44	♂	Left	Furuncles	5	...	102	12,800	..	Normal	..	0	+	0	Drainage	Recovery
10	45	♂	Left	Boils	...	3	...	24,600	35	Few pus cells	..	0	+	+	Drainage	Recovery
11	68	♂	Right	Boils	...	2	102	20,000	..	Normal	..	0	+	+	Drainage	Recovery

* In this column, ♂ denotes male; ♀, female.

Case 7.—A man, aged 48, had been subject to boils on the head, around the eye, and on the side of the face for many years. Five weeks before coming to the clinic, pain developed in the left costovertebral angle, and was followed by chills, and fever of 105. At the onset of this trouble, there was a boil on the back of the neck. His daily temperature was abnormal, at times as high as 104.

At the time of admission, May 10, 1919, there was a tender mass in the region of the left kidney. The urine contained only a few pus cells and erythrocytes. There was leukocytosis of 14,400. A combined phenolsulphonephthalein test showed a return of 45 per cent. of the dye in two hours. A diagnosis of left perinephritic abscess was made, and simple drainage instituted. The patient's convalescence was satisfactory, and he was dismissed four weeks after operation.

Case 8.—A girl, aged 14 years, was taken sick with acute tonsillitis, two months before coming to the clinic. Within a few days the tonsillitis was followed by pain in the right lumbar area, and after several days a right perinephritic abscess was drained.

On admission to the clinic, Nov. 7, 1918, the fever was persisting, and the wound still discharging. The patient was in a septic condition. Exploration of the sinus resulted in the evacuation of about a quart of pus from a right perinephritic abscess, with almost complete destruction of the kidney. Convalescence was uneventful.

Case 9.—A man, aged 44, had had boils at various times during the last eight years, and had recently had a series. Five weeks before admission to the clinic, pain developed high in the left abdomen, radiated to the bladder, and was accompanied by frequency, chills, and fever of 103 daily.

On admission, Aug. 8, 1916, the patient appeared very ill, and had a temperature of 100.2. Although no mass was demonstrable, the area of greatest tenderness was in the left costovertebral angle. Urinalysis was negative, microscopically. There was a leukocytosis of 12,800. A large left perinephritic abscess was drained. Convalescence was satisfactory, and the patient was dismissed from observation three weeks after operation.

Case 10.—A man, aged 45, had frequently had boils. Following a series, three months before admission, pain developed weeks after the onset of furunculosis, pain developed in the region of the right kidney; the patient had a daily fever of from 99 to 102, with occasional chills, and had lost about 30 pounds (13.6 kg.).

On examination, Oct. 1, 1909, the patient's temperature was 100.4, and a huge mass was found in the upper right part of the abdomen, extending through to the lumbar region. The leukocytes numbered 20,000, of which 82 per cent. were polymorphonucleara. Drainage of a huge perinephritic abscess was followed by an uneventful convalescence and complete recovery (Table 4).

PERINEPHRITIC ABSCESS AS A UROLOGIC PROBLEM*

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Perinephritic abscess is a disease that has long been known; it was described by Hippocrates[1] in 460 B.C., who said, "As soon as a swelling has appeared in the region of the kidney, one should incise it down to the kidney." It is only within recent years that surgeons have deviated a hair's breadth from this advice. From the time of Hippocrates until 1879, when Rayer[2] classified perinephritic abscess as primary and secondary, considering those primary which originated in the perinephritic tissues and those secondary which extended to the perinephritic structures from a diseased kidney, no advance was made in the knowledge of this subject. It was Ramon Guiteras[3] who, in writing on this subject in

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1. Hippocrates: De Affectionibus Internis, 14, 15, 17, Littres edition 7: 203.

2. Rayer: Maladies de reins, Paris 3, 1839.

3. Guiteras, Ramon: Etiology, Diagnosis and Treatment of Perinephritic Abscess, New York M. J., Jan. 27, 1906.

1906, stated that it was his conviction that primary perinephritic abscess did not exist except as a direct infection of the wound. Gustav Doberauer,[4] in presenting a study of twelve cases of perinephritic abscess, believed that these abscesses may occur by being deposited into the perirenal tissues directly by the blood stream by the route of the renal artery. He further states that the renal branches perforate the capsule of the kidney and supply the perinephritic tissues. This makes possible and clear the idea that the blood stream may deposit into the perirenal substance septic material that may produce suppuration without the kidney itself being directly involved. It would be useless to consider all the hundreds of references to perinephritic abscess in the literature, because it has been only within recent years that cases have been properly studied from a urologic standpoint, and conclusions drawn from such knowledge. A few such references, however, will be of interest as filling out the interval from Rayer to the present time. Goddy,[5] in 1880, reported a case of perinephritic abscess treated by aspiration, with recovery. Riverdin [6] for whom a type of skin graft is named, also wrote about the use of the aspirator in the treatment of perinephritic abscesses. At one time, aspiration was the treatment of choice in these cases. We now feel at liberty to plunge a needle into the loin with the same impunity that needles are pushed into the chest for purposes of diagnosis. Gibney,[7] in 1880, reported a total of twenty-eight cases of this malady in children. Stuckey,[8] in 1878, recorded a case of double perinephritic abscess. Another such case is described by Jianu.[9] In this article I am reporting a series of ten cases of perinephritic abscess, in every one of which a careful urologic examination was made.

REPORT OF CASES

CASE 1.—A colored man, aged 33, complained of pain in the back, weakness, fever, loss of weight and chills for the past fifteen months. The onset of the disease had been gradual. The patient had been up and about up to the time of admission to the hospital. He had lost 20 pounds (9 kg.) in weight. Nocturia had occurred two and three times a night, with chills every night for fifteen months. The etiologic factor was undetermined. There was bulging over the right loin. There was a fluctuating tumor under Poupart's ligament on the right. The temperature was from 99 to 104 F. The urine contained pus. White blood corpuscles were 22,000; red blood corpuscles, 3,000,000; polymorphonuclears, 86 per cent. The bladder was normal in appearance and capacity.

TABLE 1.—*Urologic Findings in Case 1*

	Left Kidney	Right Kidney
Phenolsulphonephthalein appearance time	3.5 minutes	7 minutes
Quantity in 15 minutes	8 per cent.	7 per cent.
Albumin	+ +	+
Casts	+	+
Pus	Few	Many
Cultures	No growth	Staphylococcus

No acid fast bacteria were found. Free drainage was instituted as treatment. Death from exhaustion occurred two months after the patient left the hospital. There was no necropsy.

4. Doberauer, Gustav: Ueber den Perinephritischen Abscess, Beitr. z. klin. Chir. **96**: 319-342, 1915.
5. Goddy, N. D.: Perinephritic Abcess Treated by Aspiration, St. Louis M. J. **29**: 518, 1880.
6. Riverdin, J. L.: Abcess périnephritique, J. de méd. et de chir. prat. **51**: 403, 1880.
7. Gibney, N. P.: Perinephritic Abcess in Children, Chicago M. J. & Exam. **41**: 561, 1880.
8. Stuckey, J. S.: Case of Double Perinephritic Abscess, St. Louis M. J. **36**: 222, 1878.
9. Jianu, I.: Doubl: Perinephritic Abcess, Spitalul, Bucuresci **32**: 337, 1912.

The urologic findings in this case were not clear cut and definite. The conclusion from such findings was that the two kidneys were functioning alike and that the two were equally damaged by a toxic nephritis. It has been several years since the patient was operated on, and it sometimes happens that one's judgment is better at a little distance from the case under discussion. I am of the opinion now that this case was probably one of an extension of the disease from some other organ, and that the kidney was not primarily at fault. It is interesting to note that the remittent temperature continued to fluctuate between 98 and 102 or 103 F., after drainage as well as before, and this continued until death occurred from exhaustion. The duration of this illness is not so remarkable when one considers that the diagnosis in these cases is often missed and that they are frequently not diagnosed in the early stages of the disease, when the diagnosis is more or less difficult.

CASE 2.—A white woman, aged 53, complained of pain in the left side, loss of weight, weakness, frequency of urination and dysuria. The duration of the disease was two years. An abscess had been drained twice before. The patient's weight had fallen from 170 pounds (77 kg.) to 115 pounds (52 kg.). Examination revealed a palpable mass in the left loin and dense scar masses over the left kidney. The urine was loaded with pus. The etiologic factor was renal calculus and calculus pyonephrosis. The temperature varied from 99 to 101 F. Examination of the blood showed: white blood corpuscles, 18,000; red blood corpuscles, 6,000,000; hemoglobin, 70 per cent.; polymorphonuclears, 80 per cent. A record of two years before showed: white blood corpuscles, 13,000; red blood corpuscles, 4,000,000; polymorphonuclears, 79 per cent. The bladder was congested throughout. Pus was seen coming from the left ureter.

TABLE 2.—*Urologic Findings in Case 2*

	Left Kidney	Right Kidney
Phenolsulphonephthalein appearance time	None in 30 minutes	4 minutes
Quantity in 15 minutes	None	20 per cent.
Albumin	+	—
Casts	—	—
Cultures	Staphylococcus	—

A roentgenogram showed a large stone in the left kidney. A nephrectomy was performed, and the patient recovered.

We have here a case of more than two years' duration in which nephrectomy was finally done. Had a complete urologic examination been done at the onset of the woman's trouble she would have been spared two years of suffering, for such an examination would have revealed a wrecked kidney, complicated with stone. The duration of this condition is interesting, and calls to mind a case reported in 1904 by Moleen.[10] This was a case of a recurrent perinephritic abscess of twenty-six years' standing in which nephrectomy was done, and the patient recovered. The causative factor in Case 2 was infection produced by the presence of a stone in the kidney. Stones do not produce perinephritic abscesses until they have ulcerated through the substances of the kidney, permitting pus to be liberated into the perinephric space. This is the manner in which a calculous pyonephrosis usually causes a perinephritic abscess.

CASE 3.—A white woman, aged 40, complained of pain in the right loin, and headache, fever, pain, and nocturia from three to four times a night. The duration of the disease was three weeks. The patient was ambulatory until admitted to the hospital. There was a small tumor mass in the right upper quadrant of the abdomen, and tenderness to pressure.

10. Moleen, G. A.: Perinephritic Abscess, Denver M. Times **24**: 580, 1904.

There was a slight bulging of the right loin. The etiologic factor was a carbuncle on the neck six weeks prior to admission. The temperature varied from 98 to 101 F. The urine contained pus. White blood corpuscles were 13,000; polymorphonuclears, 80 per cent.; red blood corpuscles, 4,600,000; hemoglobin, 79 per cent. The bladder capacity was normal, and the mucosa normal throughout.

TABLE 3.—*Urologic Findings in Case 3*

	Left Kidney	Right Kidney
Phenolsulphonephthalein appearance time	6 minutes	3 minutes
Quantity in 15 minutes	7 per cent.	Trace
Albumin	—	—
Casts	—	—
Pus	Occasional	Many
Epithelial cells	Few	Many

A pyelogram was made with 30 c.c. Simple drainage sufficed to cure.

In this case, the urologic examination was important in that it revealed a damaged right kidney. It is interesting to note, too, that this infection was metastatic from a carbuncle on the neck. As frequently happens, the carbuncle, which was the original focus of infection, had been healed and almost forgotten before the onset of the abscess. Carbuncle is not an infrequent cause of perinephritic abscess. Coenen [11] reports five cases of perinephritic abscess following carbuncle and paronychia from the Breslau surgical clinic. Simple drainage sufficed to cure this patient, although our urologic findings indicate that at some future date she will have trouble with the right kidney. Another fact illustrated by this case is that a pyeonephritis or a pyelitis almost never causes a perinephritic abscess. In this case we have two separate and distinct pathologic pictures, one a pyelonephritis, the other a perinephritic abscess.

CASE 4.—A white man, aged 32, complained of pain in the bladder and urethra and retention of urine; retention being the outstanding symptom. The duration of the disease had

TABLE 4.—*Urologic Findings in Case 4*

	Left Kidney	Right Kidney
Phenolsulphonephthalein appearance time	3 minutes	20 minutes
Quantity in 15 minutes	20 per cent.	Trace
Albumin	+	—
Casts	—	—
Pus	—	Much
Cultures	No growth	Staphylococcus

been eight weeks, following a broncho-pneumonia. The heart and lungs were normal; the abdomen was normal except for slight tenderness in the right upper quadrant. The etiologic factor was bronchopneumonia. The temperature varied from 98 to 101. The urine contained much pus. Blood examination revealed: white blood corpuscles, 18,000; polymorphonuclears, 78 per cent.; red blood corpuscles, 4,700,000; hemoglobin, 85 per cent.

No acid fast bacteria were found. Drainage was done first; nephrectomy later.

The onset of this case is strikingly that of a metastasis from a lung infection. The main symptom was retention of urine. Only one other case is recorded in which this symptom was so marked, and that is a case reported by T. E. W. Brown [12] of a perinephritic abscess in a young man, aged 24, who had a retention of urine for six days. The case also illustrates what grief disregard of the urologic findings may get one into. Had we given proper heed to these findings, we should have done a nephrectomy at once instead of delaying. It has not been sufficiently emphasized that drainage alone will not cure a perinephritic abscess in a certain class of cases. The mere fact that pus is encountered surrounding the kidney should not prevent one from doing a nephrectomy if the condition of the patient is even fair. When the urologic findings are once established, they are so clear cut that one should not hesitate to act on them though it goes against what one has been taught.

CASE 5.—A married white woman, aged 38, complained of passing "cream colored urine" and of pain in the back. The duration of the disease had been about a year. The patient was not aware of fever. She had lost 25 pounds (11.3 kg.) in a year. A large tumor was seen in the left upper quadrant of the abdomen. The urine was loaded with pus. Examination of the blood showed: leukocytes, 19,000; erythrocytes, 4,480,000; polymorphonuclears, 80 per cent.; hemoglobin, 75 per cent. The temperature varied from 98.6 to 100 F.

A nephrectomy was performed, and the patient recovered.

TABLE 5.—*Urologic Findings in Case 5*

	Left Kidney	Right Kidney
Phenolsulphonephthalein appearance time	None in 30 minutes	3 minutes
Quantity in 15 minutes	None	22 per cent.
Albumin	+	—
Pus	Much	—
Cultures	B. coli	No growth

A curious feature of this case is that there is no history of the patient's ever having been ill before. It is a case of stone ulcerating through and producing a pyelonephritis first and a pyonephrosis which ruptured into the space surrounding the kidney. This case may be one that is classified as secondary to stone in the kidney. It also illustrates beautifully a case of chronic perinephritic abscess due to stone. We have an ambulatory patient with practically no pain who complains chiefly of the passing of cream colored urine. The perinephritic abscess was nicely encapsulated, and the patient was truly vaccinated against her own infection. Here is a case in which our urologic findings indicated nephrectomy and we did not hesitate when pus was encountered as a perinephritic abscess, but carried out a nephrectomy. Our results justified the procedure.

CASE 6.—A white man, aged 28, complained of pain in the epigastrium, and pain, fever and frequent urination for ten weeks prior to admission to the hospital. There was tenderness over the right kidney, marked tenderness over the costovertebral angle on the right side, and a slight bulging behind the kidney area. The etiologic factor was influenza. There

TABLE 6.—*Urologic Findings in Case 6*

	Left Kidney	Right Kidney
Phenolsulphonephthalein appearance time	4 minutes	3 minutes
Quantity in 15 minutes	15 per cent.	12 per cent.
Albumin	—	Trace
Casts	—	—
Pus	—	+ + +
Cultures	No growth	No growth

were unilateral multiple septic infarcts of the kidney. The temperature was from 98 to 103 F. The urine was loaded with pus. Examination of the blood showed: white blood corpuscles, 24,000; polymorphonuclears, 88 per cent.; red blood corpuscles, 5,000,000; hemoglobin, 86 per cent. The right ureter could not be catheterized on account of strictures. A Garceau catheter was placed in the left ureter and the urine from the right ureter was collected through the bladder.

Drainage was performed, and the patient recovered.

11. Coenen, H.: Ueber paranephritische Abscesse nach Puruukeln und Panaritien, Berl. klin. Wchnschr. **48**: 499, 1911.

12. Brown, T. E. W.: Perinephritic Abscess, Charlotte M. J. **68**: 150, 1909.

The onset of the disease in this case is strikingly that of acute unilateral septic infarcts of the kidney. Urologic examination of this case was of value, in that it proved that both kidneys were functioning properly. This is a case which illustrates that simple drainage suffices to cure certain cases.

CASE 7.—A white married woman, aged 26, became ill a week prior to admission to the hospital, with headache, sore throat, fever, chill, and a rash resembling purpura covering

TABLE 7.—*Urologic Findings in Case 7*

	Left Kidney	Right Kidney
Phenolsulphonephthalein appearance time	7 minutes	13 minutes
Quantity in 15 minutes	12 per cent.	2 per cent.
Albumin	—	—
Casts	—	—
Pus	—	+ +
Epithelial cells	+	+
Cultures	No growth	Streptococcus

the body and extremities. There was pain, tenderness and fulness over the right kidney. The temperature varied from 98 to 104 F. The etiologic factor was a virulent streptococcus infection from tonsillar infection. There was pus in the urine. Examination of the blood showed: white blood corpuscles, 21,400; polymorphonuclears, 87 per cent.; hemoglobin, 75 per cent.

Drainage was performed, and the patient recovered.

This case is of extreme interest. We made our diagnosis from the fluctuating temperature, pain in the right kidney together with a palpable mass, presumably the kidney, the white blood count and the urologic findings. On operation, only a small amount of pus was found in the perinephric space. The only other pathologic condition found was that there were adhesions to the capsule of the kidney, and in the fat capsule of the kidney there was some thickening and congestion. The next day a large amount of pus began to drain from the wound and continued to drain for several weeks. The temperature gradually subsided, and the patient made an uneventful recovery. The question arises: Did we open down to the perirenal space in this case just as the infectious material had been laid down, and almost anticipated suppuration, as it were?

CASE 8.—A white man, aged 29, complained of weakness, fever and pain in the left loin. The duration of the disease was six weeks. The etiologic factor was a metastatis from a prostatic abscess. There was bulging over the left loin in the region of the kidney. The temperature varied from 98 to 101 F. Examination of the blood showed: white blood

TABLE 8.—*Urologic Findings in Case 8*

	Left Kidney	Right Kidney
Phenolsulphonephthalein appearance time	8 minutes	4 minutes
Quantity in 15 minutes	10 per cent.	25 per cent.
Albumin	+	—
Casts	—	—
Pus	+ + +	—
Epithelial cells	+	—
Cultures	Staphylococcus	—

corpuscles, 18,000; polymorphonuclears, 86 per cent.; red blood corpuscles, 4,000,000; hemoglobin, 65 per cent.

A pyelogram was made with 40 c.c. Drainage was performed, and the patient recovered.

The main point of interest in this case is that a prostatic abscess occurring immediately before the onset of the perinephritic abscess was the etiologic factor in this case. A pyelogram showed that the kidney pelvis was dilated, and probably had been damaged at some previous time. Certainly, with an acute onset such as the patient had, we should not expect that amount of damage to the pelvis of the kidney in a few weeks' time. At operation, the kidney showed multiple small abscesses in one small circumscribed area of its cortical surface, which was undoubtedly the point of entrance of the infection into the perinephric space. The patient made an uneventful recovery on simple drainage.

CASE 9.—A white man, aged 27, complained of sudden, severe pain in the right upper quadrant of the abdomen, which radiated downward to the testis and thigh. The onset of illness had been at 4:30 in the afternoon of the day before admission. The patient was supposed to have had a ureteral stone a year before. The appendix was removed at that time. Persistent vomiting was a marked feature of his condition. The daily temperature variation was from 98.6 to 101 F. There was marked tenderness over the right kidney, and rigidity of the whole right side of abdomen. The specific gravity of the urine was 1.027; motile bacilli, pus and red blood cells were present. The etiologic factor was tuberculosis pyonephrosis with multiple ureteral strictures. The white blood count was 19,000 on three different days; red blood cells, 5,000,000; polymorphonuclears, 93 per cent.; hemoglobin, 96 per cent.

Three chemical examinations of the blood revealed: blood urea: 31.72, 11.68, 18.21; creatinin: 2, 2.3, 2.1; chlorids: 390, 420, 500.

Cultures from the right kidney on one occasion yielded a streptococcus and on another occasion a staphylococcus. No acid fast bacteria were found.

TABLE 9.—*Urologic Findings in Case 9*

	Left Kidney	Right Kidney
Phenolsulphonephthalein appearance time	4 minutes	18 minutes
Quantity in 15 minutes	20 per cent.	None
Albumin	—	+
Casts	—	—
Pus	—	+ + +

A pyelogram was made with 30 c.c. A nephrectomy was performed, and the patient subsequently recovered.

This case is of considerable interest because we had had this patient under observation for about a year. We had made a pyelogram of the right kidney about ten months before the onset of his present trouble. This pyelogram showed that there was considerable dilatation of the pelvis of the kidney on the right side, with loss of proper shape of the calices. The right function at that time was very much diminished. The appearance time of the phenolsulphonephthalein was eighteen minutes. After the dilatation of the strictures of the ureter, the function of this kidney recovered to a very marked degree. The patient left the hospital and went to work. He was seen at intervals of sixty days until the time of admission to the hospital for his present trouble. He had apparently been getting along very nicely without pain in his side over the right kidney and without any fever, and there was no pus in the urine, when suddenly at 4:30 on the afternoon preceding the day of admission, he was seized with a severe, sharp pain and an elevation of temperature. Dilation of the ureter relieved him for a short time, but he soon had the pain again. It became evident that he had a perinephritic abscess, for he was beginning to have a swelling in the loin. Operation was done, and it was found that in addition to the lake of pus that surrounded the kidney, the kidney itself was in bad condition. A nephrectomy was deemed the wisest thing to do. The patient made an uneventful recovery and left the hospital on the

tenth day. This is another case which illustrates the advisability of doing a nephrectomy at the time of drainage. It shortens the patient's time in the hospital and conserves his strength, to say nothing of the fact that a nephrectomy is much easier at this time than it would be as a secondary operation. This also shows a type of renal tuberculosis which never, at any time, showed acid-fast bacilli in the urine or any tubercles or signs in the bladder, largely because the disease was confined to the cortex. The strictures and kinking were responsible for the hydronephrosis.

Case 10.—A white woman, aged 43, complained of pain in the right upper quadrant of the abdomen, dysuria, burning and frequency of urination. She had had "bladder trouble" for the past two years. She looked ill and had been in bed for weeks. There was tenderness and a tumor in the right upper quadrant and rigidity of the right half of the abdomen. The duration of the disease was probably three months. The temperature varied from 99 to 102 F. The etiologic factor was tuberculous pyonephrosis. The urine was loaded with pus. Examination of the blood showed: leukocytes, 28,000; polymorphonuclears, 92 per cent.; red blood corpuscles, 2,760,000; hemoglobin, 40 per cent.; blood urea, 21.6; creatinin, 2.

Nephrectomy was performed. The patient recovered.

Table 10.—*Urologic Findings in Case 10*

	Left Kidney	Right Kidney
Phenolsulphonephthalein appearance time	3 minutes	None
Quantity in 15 minutes	22 per cent.	None
Albumin	—	—
Casts	—	—
Pus	—	—
Cultures	—	Heavy pus Staphylococcus

This illustrates of how much value a complete urologic examination may be in any case in which there is pus in the urine. This patient gave a history of having had dysuria and frequency of urination for two years. She was supposed to have had attacks of gallbladder disease, and on this admission to the hospital she had an attack of pain in the right upper quadrant of the abdomen. The gallbladder was exposed and the bulging mass was found to be retroperitoneal. A complete urologic examination was then done, and it was found that the right kidney was wrecked. A very interesting feature of this case was the pyelogram, which showed the opaque medium escaping through a small sinus through the cortex of the kidney into the perinephric spaces. This case, like Case 9, had as an etiologic factor a tuberculous pyelonephrosis. The patient made a rather tedious recovery, but finally, after many weeks, got so she could leave the hospital.

SUMMARY

In ten cases of perinephritic abscess, five patients were men and five, women. Six cases should be classed as acute; four should be classed as chronic. Seven of the abscesses were right sided; three left sided.

The average age of the patients was 34.9 years; the youngest being 26, and the oldest 53.

Nephrectomy and drainage was done in five cases, and drainage alone in five cases.

One patient died; nine are living.

On careful urologic examination, all showed findings important enough to be a determining factor in the treatment.

The diagnosis of perinephritic abscess rests mainly on pain, tenderness or tumor in the loin, a remittent type of temperature and a high leukocyte count.

The treatment is early operation, and should not be undertaken without a complete urologic examination.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. HUNT AND OCKERBLAD

Dr. William F. Braasch, Rochester, Minn.: I know of no condition in the field of urology which can be more difficult to diagnose than perinephritic abscess. Two types of perinephritic abscess must be considered. One is secondary to evident disease of the kidney, such as stone, pyonephrosis or tuberculosis, and the other is that type of perinephritic abscess which has its origin in a small, circumscribed area of infection in the renal cortex, but offers no clinical data that will permit its recognition. A perinephritic abscess of the first type occurs in a comparatively small percentage of primary surgical lesions of the kidney. When it is present it can usually be recognized by definite clinical data. When, in the presence of a primary renal stone, pyonephrosis or hydronephrosis, there is a recent onset of constant pain and tenderness referred to the flank, together with bulging of the tissues in the renal area, perinephritic abscess is indicated. In the majority of these cases, immediate surgical intervention is indicated. The clinical recognition of the so-called true perinephritic abscess is much more difficult and involved. One of the most important underlying factors in the patient's history is the recent existence of superficial infections, which the patient may refer to as a "boil" or a "pimple." This history, together with recent onset of fever, dull pain referred to the renal area, and tenderness on pressure there, forms the most common clinical data. Attention should be called to the fact that true perinephritic abscess will sometimes heal spontaneously, if the patient is put to bed and given general care. We are not justified in doing this, however, without demonstrating that there is no underlying renal lesion, through complete cystoscopic examination. When the symptoms do not subside in the course of a week or ten days, drainage is, of course, indicated. Dr. Ockerblad is right in saying that practically every case of perinephritic abscess has its origin in a lesion of the renal cortex. These cortical lesions may be so small that they cannot be found without careful search. They are usually subcapsular, and are probably never primarily in the kidney, but metastatic. We have been disappointed often because of the absence of clinical data that we could use in recognizing these lesions. The cystoscope, the functional tests and the pyelogram will all fail us in many cases. I hoped several years ago that careful differential culture of the urine would aid us, but this has not proved to be of much practical value. In only a small percentage of cases have we been able to obtain positive differential cultural data. In spite of the negative clinical data, the presence of a renal lesion must be thought of in these cases.

Dr. Frederick C. Hesrick, Cleveland: As Dr. Braasch has said, these cases offer much difficulty in diagnosis. They often require a close knowledge of disease outside the genitourinary tract. I have seen several cases in which the diagnosis was very difficult; for instance, in a retrocolic perineal abscess of appendical origin; in gallbladder infection with hepatoptosis and an enormous gallbladder, in which the diagnosis from perineal abscess was very difficult; and in one case the pyelogram was of great value because it showed the kidney on top of the abscess cavity, with a thin layer of gas between. It showed a dilatation of the kidney pelvis and the large abscess below. I have also seen two cases of double perinephritic abscess. One of these patients had multiple furuncles with glycosuria. He had one abscess drained, and left the hospital in good condition, but returned in a short time with a recurrence on the other side. He was put on diabetic treatment and recovered very well. In the other case we did not know the source of the infection. It occurred on the right side primarily, and secondarily on the left side, with an interval of about a month between. After the second perinephritic abscess, this patient developed an osteomyelitis of the temporal bone. She had a focus of infection somewhere, and these abscesses were due to it. I like the term

"subrenal abscess" better than "perinephritic abscess" because I think that in the majority of cases the abscesses are below. When they originate from stone this does not hold true, and the abscesses are likely to be above. I have seen many around the lower pole of the kidney. The foramen of Bochdalek formed between the right crus of the diaphragm and its internal arcuate ligament is an area three-fourths inch in size, unprotected by diaphragm, so that the pleura is the only tissue between the flank and the lung. Infection may travel from the pleura to the perineal tissues or vice versa with abscess formation. I have seen one such case in which this was the only apparent explanation of the perirenal abscess. A source of infection that has not been mentioned is that which sometimes occurs from carcinoma of the colon or diverticulitis, also as an ascending infection from pelvic infection.

DR. ARTHUR L. CHUTE, Boston: I was surprised to hear Dr. Hunt speak of the relative rarity of the double type of nonrenal perinephritic abscess, of which I have seen a number of cases. The first case I saw in the influenza epidemic of 1918, the other about two years ago. In the second case, the man had had vague symptoms referred to the rectum for some time. This had been attended by elevation of temperature. There was nothing definite at first, but gradually there was added to the pain tenderness and resistance in the right loin. I opened the right loin and evacuated about 1 ounce of pus. Later the same thing occurred on the left side. In most instances, perineal abscesses of this type are due to the staphylococcus, sometimes *S. aureus* and sometimes *S. albus*. I agree with Dr. Herrick that one will sometimes have difficulty in finding the pus pocket in these cases. I have found a small abscess high and toward the inside on several occasions when I was about ready to acknowledge that I was baffled in my search. These patients are relieved so quickly by the operation, which is of so relatively little danger, that I can hardly agree with Dr. Braasch about the wisdom of waiting for Nature to help them get well.

DR. IRVIN S. KOLL, Chicago: I had a case which showed the value of pyelography as an aid in the definite diagnosis. This patient gave a definite history of sepsis. He had a palpable mass in the right quadrant, more toward the side than the front. There was a definite compression of the pelvis, but the urine coming from the kidney was perfectly normal. After the diagnosis was made, incision liberated a large amount of pus and the patient went on to definite recovery.

DR. JAMES A. GARDNER, Buffalo: I did not realize until I heard Dr. Hunt's paper how rare these bilateral cases are. I had a man in 1920 who had been in the service and was very sick for six weeks or two months. He was thought at one time to have typhoid, and because of the history of having been gassed, was thought to have tuberculosis. He had been examined by a number of men and was referred to me by his physician, who had already made the diagnosis by drawing off pus from both sides. We opened the abscess under local anesthesia, and there was such pressure that the pus spurted across the operating room for a distance of 4 or 5 feet. The urine had been normal, and cystoscopic examination did not show anything in the urinary tract. Shortly after that, I had a bilateral case of tuberculous origin. The patient had had an elevation of temperature, which his physician had felt was due to the pulmonary condition, when it was discovered that he had a perinephritic abscess. We drained the abscess and he had a very stormy sort of convalescence; but after being sent to Perrysburg, where they use the Rollier treatment, he recovered and has come back looking well.

DR. BRANSFORD LEWIS, St. Louis: The great difficulty in diagnosing these abscesses makes me think it worth while to mention a diagnostic sign not referred to, and that is the relatively greater rigidity of the muscles on the affected side in perinephritic abscess. In one case, aside from the leukocytosis and various indirect signs, that was the only direct sign present. Following withdrawal of the pus, the patient recovered without further operation.

DR. LEON HERMAN, Philadelphia: It is of some practical assistance to attempt to draw a clear line of differentiation between the several types from the point of view of origin. The majority of cases undoubtedly represent metastatic lesions in the renal cortex. The type resulting from lymphatic extension is very often exceedingly difficult to diagnose, and the same is true in the early stages of abscess resulting from necrosis of the spine. I was extremely interested in Dr. Hunt's case, and in the one reported by Dr. Ockerblad, which resulted from lymphatic extension. We have had a case arising from infection incidental to an indwelling urethral catheter. This patient came to the hospital with retention due to prostatic obstruction, and an indwelling catheter was inserted; this was followed by fever, which continued for three weeks without any localizing signs in the renal regions. At the end of this time he developed a mass which proved to be a very large perirenal abscess. We could demonstrate no renal lesion at the time of operation. Some time ago a colored man was admitted to the Pennsylvania Hospital with a diagnosis of perirenal abscess. The roentgenogram revealed a spinal erosion, which was supposed to be the source of the abscess. This patient was found to have a pulsating mass in the abdomen, which proved to be an aneurysm. This explained the spinal erosion and the localized tenderness in the renal region. The pyelogram in this case was interesting because it was capped by a cornucopia-shaped shadow from the aneurysmal sac. In another case, following perineal operation for prostatic abscess, there were symptoms indicative of infection around the left kidney, which proved eventually to be due to abscess of the lower lobe of the left lung. All attempts to diagnose the location of the abscess in this case were fruitless, and no very definite signs of localization in the lung were demonstrable.

DR. HERMAN L. KRETSCHMER, Chicago: As I see the question, there are three types of cases: first, those in which there is a coexisting pathologic condition in the kidney, such as stone or tuberculosis; second, the purely metastatic type, in which the patient gives a history, often not until questioned carefully, of carbuncle, furuncle or similar infection, and, third, a type of great interest in which there is no pathologic condition in the kidney and no evidence of peripheral infection. I have gone over these cases very thoroughly looking for foci of infection in the teeth and tonsils, with no result at all. In addition to that, we look over the skin carefully to see whether we can find abrasions or recently healed abrasions, which might have been the atria through which the staphylococcus might have gained entrance. We look particularly between the toes and fingers. Dr. Phemister has repeatedly stated that he believes that in cases of osteomyelitis the staphylococcus gains entrance through some small superficial abrasion of the skin; but I believe that in this third group the atrium of infection is often a small abrasion of the skin that has healed and hence is overlooked.

DR. VERNE C. HUNT, Rochester, Minn.: My chief reason for presenting this subject was to recommend the attention that should be directed to the relationship existing between peripheral infection and the development of perinephritic abscess. It is not unreasonable to suppose that, as the result of some superficial skin lesion, bilateral kidney infection may occur, and does occur with more frequency than we are aware. I think that the case which Dr. Kretschmer reported two years ago is of great interest. I am glad to learn that Dr. Herrick, Dr. Gardner and Dr. Chute have all observed bilateral abscess. This leads to the belief that they occur more often than we ordinarily believe. In our experience, to my knowledge, we have had but one such case.

DR. NELSE F. OCKERBLAD, Kansas City, Mo.: It is probable that Ramon Guiteras was correct in saying that there is no such thing as primary perinephritic abscess. Paranephritic abscess, or direct infection of the fat capsule of the kidney, is rarely if ever reported now, and careful urologic examination would probably exclude some of the cases which are reported as primary abscess. I have not dwelt on the roentgen-ray findings and their diagnostic importance in these cases, but if you will review the roentgenograms of perinephritic abscess which you have, you will find that almost all of them show shadows in the region of the abscess with obliteration of the psoas. In some cases, cautery excision

or dissection of the diseased areas of the kidney should be done in addition to drainage. The point I have made is that a complete urologic examination should always precede every operation for perinephritic abscess, not always to make or establish the diagnosis, which in most instances can be made without this aid, but as a guide in the treatment. Otherwise, the surgeon is working blindly.

THE DIFFERENTIAL DIAGNOSIS OF CORONARY OCCLUSION AND OF CHOLELITHIASIS *

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Until recent years, coronary occlusion has been a diagnosis made only post mortem, for the old teaching of Cohnheim that occlusion of a coronary artery always spells immediate death has dominated the minds of clinicians in spite of ample experimental and clinical evidence to the contrary. Thirty years ago, Porter [1] showed that ligation of a coronary artery is not necessarily fatal in dogs. This experiment has been repeated many times by subsequent workers, and it is now generally accepted that a dog may live for months after ligation of a coronary artery. In 1912, Herrick [2] described a group of clinical cases of coronary thrombosis presenting more or less characteristic symptoms, "in which the accident is usually fatal, but not immediately, and perhaps not necessarily so" and may be mistaken for an acute abdominal condition. The close resemblance of this irreparable cardiac injury to a surgical emergency demanding immediate intervention has since been emphasized by others, notably Levine and Tranter,[3] and by Wearn [4] in his analysis of nineteen cases of coronary thrombosis.

We have recently been impressed with the difficulty of distinguishing between the two conditions clinically by our experience with three cases in which coronary occlusion produced symptoms closely simulating cholelithiasis.

REPORT OF CASES

Case 1.—A superintendent of detectives, aged 60, well developed and very obese, weighing about 220 pounds (100 kg.), was sent from Vermont by his physician for an operation, with a diagnosis of gallstones. He gave a history of repeated attacks of very severe pain in the right lower chest and right hypochondrium, with a good deal of indigestion between attacks. He was never jaundiced. For several years he had been working excessively without taking a vacation, and he felt very much run down. During the week's stay in the hospital his condition improved markedly, and the night before his death a careful physical examination revealed nothing abnormal except heart sounds of a distinctly tic-tac nature, the first sound at the apex being of about the same quality as the second. The rhythm was regular. The rate was 64. The blood pressure was 125 systolic and 80 diastolic. The lungs were clear. There was no tenderness or spasm in the abdomen, and the liver edge was not made out. There was no icterus. The urine was negative.

In view of his extreme obesity and the marked improvement in his general condition after a week's rest in the hospital, it was decided that, in the absence of emergency indications for surgical intervention, he should take a prolonged vacation with dietary restrictions and return after three months for further study.

The next day he was found dead on the floor of his room. Necropsy revealed a complete arteriosclerotic occlusion of a branch of the descending left coronary artery, with an infarct of the left ventricular wall, rupture of the left ventricle and hemopericardium. The gallbladder contained two stones, with the mucosal lining intact and not inflamed.

Case 2.—A woman, aged 55, was also referred by her local physician with a diagnosis of gallstones. Over a period of six months, she had had attacks of very severe pain in the right lower chest and right upper abdomen radiating upward over the chest on both sides and, to a slight extent, downward into the lower abdomen. The pain did not radiate down either arm. When seen, May 31, 1922, she presented no abnormal physical signs, and roentgen-ray examination of the heart, lungs, gallbladder region and gastro-intestinal tract were negative. The diagnosis of angina pectoris was made at this time. October 6, she was seen in the midst of an acute attack. Her physician had given her three-fourths grain (0.05 gm.) of morphin to relieve the pain, which was extraordinarily severe. Her color was ashen gray, and she looked seriously sick. The heart was not enlarged, and the sounds were normal. There was an intense spasm in the right upper quadrant. The temperature by mouth was 100.5 F. She was removed to a hospital, where an additional half grain (0.03 gm.) of morphin was required to relieve the pain. It was the opinion of three physicians who saw her at this time that she had gallstones. Operation was finally decided on, and she was taken to the operating room. However, she had taken only two or three breaths of ether when she suddenly became unconscious and died.

Necropsy revealed practically complete arteriosclerotic occlusion of the right coronary artery, with marked diminution in the lumen of the descending branch of the left. The gallbladder was normal.

Case 3.—In the summer of 1920, a busy and distinguished surgeon, aged 65, was seen in consultation because he was suffering from acute pericarditis and paroxysmal auricular fibrillation. These conditions appeared a couple of days after a prolonged attack of very severe pain in the epigastrium, which the patient himself, renowned for his ability in gallbladder diagnosis and surgery, had diagnosed as a gallstone attack. He recovered slowly from this illness but never regained his normal health, and after a few months died from heart failure. Without much doubt, coronary thrombosis with cardiac infarction caused his pain and pericarditis and auricular fibrillation; but, at the time, this diagnosis was not thought of.

SYMPTOMS

These three striking cases stimulated us to investigate the detailed symptomatology of the two conditions cholelithiasis and coronary occlusion, in order (1) to ascertain how often the differential diagnosis between them does present a real problem, and (2) to evaluate properly the important distinguishing features.

Accordingly, at the Massachusetts General Hospital we have made a detailed analysis of the history, physical examination and laboratory data in thirty consecutive cases of coronary occlusion found at necropsy, and have compared the findings with those obtained in thirty consecutive cases of cholelithiasis confirmed by operation.

The cholelithiasis cases all came to operation in 1922, while the cases of coronary occlusion cover a period from 1909 to 1924.

Sex.—The comparative incidence of the two conditions with regard to sex presented striking differences. In the coronary occlusion group, twenty-four were males and only six females; in the cholelithiasis group, the converse was true; there were six males and twenty-four females.

Age.—The average age in the coronary cases was 58 years, ranging from 42 to 76 years. There were seven of these patients who were older than the oldest cholelithiasis patient. The gallbladder group averaged

* From the Massachusetts General Hospital.

1. Porter, W. T.: J. Physiol. 15: 121-138, 1894.
2. Herrick, J. B.: Clinical Features of Sudden Obstruction of the Coronary Arteries, J. A. M. A. 59: 2015 (Dec. 7) 1912.
3. Levine, S. A., and Tranter, C. L.: Am. J. M. Sc. 155: 57-66 (Jan.) 1918.
4. Wearn, J. T.: Am. J. M. Sc. 165: 250 (Feb.) 1923.

47.2 years in age, ranging from 23 to 65 years. Twelve of these patients were younger than the youngest patient with coronary occlusion.

Admission Diagnoses.—None of the patients in this study were admitted to the hospital with a diagnosis of coronary occlusion. In the coronary group, the following diagnoses are recorded: cardiac disease (all types), seventeen; malignancy, five; cirrhosis of the liver, one; fracture of the humerus, one; pulmonary abscess, one; arteriosclerosis, one; acute infection, one; no diagnosis, three. Necropsy showed all but one of these diagnoses to be correct as far as they went, the coronary occlusion being superimposed. After admission to the hospital, the diagnosis of coronary occlusion was made in three cases before the patients died. An exploratory laparotomy for cholelithiasis was performed in one of the coronary cases, the surgeon reporting that no cause for the pain could be found.

Gallbladder disease was the admission diagnosis in twenty-six of the cholelithiasis group; acute pancreatitis in one; malignancy (?) or peptic ulcer (?) in one, and "study" in two.

NECROPSY FINDINGS IN CORONARY OCCLUSION

Only cases showing complete or practically complete occlusion were taken. The more important relevant findings are grouped in Table 1.

Seven of the cases of left coronary occlusion showed also an advanced process in the right coronary artery either markedly narrowing its lumen or completely plugging its distal portion. Two of the cases of right coronary occlusion showed also a partial occlusion of the left coronary artery.

TABLE 1.—*Necropsy Findings in Coronary Occlusion*

Occlusion of descending branch of left coronary artery	22
Occlusion of left coronary artery at its orifice	2
Occlusion of right coronary artery	5
Occlusion of circumflex branch of left coronary	1
Arteriosclerosis of coronary arteries	25
Syphilitic aortitis	4
Vegetative endocarditis with embolism	1
Hypertrophy and dilatation of the heart	27
Chronic interstitial myocarditis	17
Passive congestion	16
Mural thrombi	13
Pericarditis	10
Infarcts of lungs	8
Cardiac aneurysm	3
Perforation of interventricular septum	1

DURATION OF THE DISEASE [5]

Coronary Occlusion.—In twenty-one cases, the duration of illness from the onset of the severe symptoms of occlusion to death ranged from an hour and a half to five years, the average duration in those who had symptoms being 198.7 days, or about six and one-half months. Sudden death without previous history to suggest occlusion occurred in seven cases. No history was obtained in the remaining two.

Cholelithiasis.—In this group the total duration of illness up to the time of operation varied from twenty-four hours to twenty-seven years, with an average of 844 days, or about twenty-eight months.

PAST HISTORY

In the previous history, the incidence of both rheumatic and venereal infections is about equal in the two groups of cases. A previous history of angina, however, is an important distinguishing feature, being found in thirteen of the cases of coronary occlusion and in none of the cholelithiasis group.

TABLE 2.—*Location and Distribution of Pain*

	Coronary Occlusion	Cholelithiasis
POSITION OF PAIN		
Precordial	2	0
Substernal	2	0
Chest	1	0
Both precordial and epigastric	2	0
Epigastric	5	15
Lower abdomen	2	0
Diffusely over abdomen	1	0
Right upper quadrant	0	9
Right upper quadrant and epigastrium	0	1
Lower right thorax	0	2
Angle of right scapula	0	1
Left breast	0	1
Both flanks	0	1
RADIATION OF PAIN		
Radiating	12	26
Nonradiating	3	4
To both shoulders	10	3
Down left arm	5	0
To left shoulder alone	0	1
Along right costal margin	0	7
To right shoulder alone	0	7
To back	0	14

Thoracic pain alone, 5; Abdominal pain alone, 8 } coronary occlusion.
Abdominal pain alone, 25; Thoracic pain, 4 } cholelithiasis.

PRESENT ILLNESS

Pain.—Table 2 gives the location and distribution of pain in the two conditions. Typical anginal pain has been excluded from this table. Fourteen of the coronary patients gave no history of pain. In one, no history was obtained.

Character of the Pain.—The pain in the cardiac cases was usually described as a choking, oppressive or suffocating feeling. In four cases, it was described as sharp. In the gallstone group, the pain was commonly of a sharp, knifelike character, although in two cases it was never more severe than a dull ache.

Duration of the Individual Attacks of Pain.—There was no striking difference between the duration of individual attacks in the two groups, ranging, in the coronary cases, from a few minutes to a month, and in the gallstone cases, from half an hour to ten days.

TABLE 3.—*Association of Other Symptoms with the Attack of Pain*

	Coronary Occlusion	Cholelithiasis
Nausea	5	12
Vomiting	3	14
Palpitation	3	0
Dyspnea	17	0
Syncope	6	0
Faintness	3	0
Vertigo	3	0
Weakness	4	2
Tenderness in right upper quadrant	5	23
Tenderness over the precordium	1	0
Tenderness over the lower sternum	1	0
Tenderness over the epigastrium	1	0

Exciting Cause of Pain.—In six of the coronary occlusion cases the onset of the pain was associated with exertion, and with eating in two. In the gallstone group, there was no association of the pain with exertion, but in four cases eating brought on the pain.

Relief of Pain.—Nitrites were administered in seven of the coronary cases, with relief of pain in two and no relief in five. Morphin was given in two cases

5. It is of interest to note here the observation of Miller and Matthews that ligation of a main branch of the descendens artery in the dog may result in a delayed appearance of acute cardiac failure from four to six weeks after the occlusion (Miller, J. L., and Matthews, S. A.: Effect on the Heart of Experimental Obstruction of the Left Coronary Artery, Arch. Int. Med. 3: 476 [June] 1909).

with relief. In the cholelithiasis group, eleven patients received morphin with relief.

Frequency of Attacks of Pain.—Of fourteen coronary patients who gave a history of pain, nine had constant pain and five had intermittent pain, varying

TABLE 4.—*Other Signs and Symptoms Occurring During Course of Illness but Not Definitely Associated with Attack of Pain*

	Coronary Occlusion	Chole lithiasis
Jaundice	3	17
Palpitation	6	7
Dyspnea	19	3
Cough	11	3
Râles in lungs	14	9
Cyanosis	14	0
Edema	13	3
Enlarged liver	10	5
Enlarged heart	21	6
Irregular action of heart	6	0
Heart sounds not of good quality	23	2
Systolic murmurs at apex or base	13	7
Artery walls palpable	19	2
Temperature at or above 100 F.*	21	10
Pulse rate at or above 100 a minute	25	7
Leukocytes per cu. mm. 11,000 or above (of 22 cases recorded)	18	14

* Of the coronary cases, twelve had other possible cause for fever, tachycardia and leukocytosis, such as infection or carcinomatosis. In the remaining ten cases, there was no other obvious cause.

in frequency from several attacks a day to several in ten days. Only two of the gallstone patients had constant pain. The remaining twenty-eight had intermittent pain varying in frequency from an attack after every meal to three attacks in four years.

BLOOD PRESSURE AND ELECTROCARDIOGRAMS

One of the patients with coronary occlusion had an abnormally low blood pressure: 95 systolic and 60 diastolic. Otherwise, the blood pressures were not remarkable.

Electrocardiograms were taken in four of the coronary cases. An inverted T-wave in Lead II occurred in three of these, in one of which there was a possible digitalis effect. Small complexes in all leads with a notched R-wave in Lead II (probably intraventricular block) occurred in one case, and another showed right bundle branch block.

SUMMARY AND CONCLUSIONS

The signs and symptoms in thirty cases of complete coronary occlusion confirmed by necropsy were analyzed and compared with the findings in thirty consecutive cases of cholelithiasis confirmed by operation.

1. Complete occlusion of a coronary artery is found in about 1.5 per cent. of the cases that come to necropsy at the Massachusetts General Hospital.

2. The clinical picture in coronary occlusion may closely resemble that seen in cholelithiasis, but usually does not.

3. There are certain distinguishing features which should enable one to arrive at a correct diagnosis.

4. The more important distinguishing features are as follows:

(*a*) *Age.*—The youngest patient with coronary occlusion in the group studied was 42 years old; twelve of the gallstone patients were younger than this.

(*b*) *Sex.*—Coronary occlusion occurred four times as commonly in males as in females, whereas in cholelithiasis the exact reverse was the case.

(*c*) *Previous History.*—A previous history of angina pectoris is strong presumptive evidence in favor of coronary occlusion.

(*d*) *Duration of Illness.*—The coronary occlusion patients, excluding those who died instantaneously, had an average duration of life of about six and one-half months after the onset of symptoms, whereas the gallstone patients had an average duration of symptoms of about twenty-eight months before operation.

(*e*) *Pain.*—The pain may be confined to the thorax or the abdomen in either of the two conditions. Radiation to the arms is in favor of coronary disease, however, and radiation to the back is in favor of cholelithiasis. Coronary occlusion is often associated with feeling of constriction never experienced in cholelithiasis. In coronary occlusion the pain is more apt to be constant, while in gallstones more commonly the pain comes in attacks.

(*f*) *Other Symptoms and Signs.*—Evidences of cardiac failure, particularly dyspnea, râles in the lungs, cyanosis, edema and enlargement of the liver, are strongly in favor of a diagnosis of coronary occlusion. Jaundice may occur in either, but is much more common in gallstones. Poor quality of heart sounds is very significant evidence in favor of coronary occlusion (as is also alternation of the pulse).

(*g*) *Electrocardiogram.*—The electrocardiogram gives suggestive evidence in favor of coronary occlusion when it shows intraventricular block or changes in the T-wave in Lead II, but these are by no means constant findings.

TREATMENT OF ARSPHENAMIN DERMATITIS, MERCURIAL POISONING AND LEAD INTOXICATION

FURTHER OBSERVATIONS *

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In 1920, following in the footsteps of Ravaut, we began using sodium thiosulphate (ordinarily known as sodium hyposulphite) in the treatment of arsenical and mercurial poisoning. Since that time, we have added the treatment of lead and bismuth poisoning.

The treatment of metallic poison by the use of this sulphur compound is based on a solid chemical foundation. All chemists know that the presence of sulphur will cause the precipitation, as sulphids, of mercury,

Metallic Salts in Which This Treatment Has Been Successfully Used.

Arsenic	*Mercury*
Arsphenamin	Mercuric chlorid
Neo-arsphenamin	Mercurous chlorid
Silver arsphenamin	Mercuric salicylate
Sodium cacodylate	Mercurosal and many other salts of mercury
Liquor potassii arsenitis	
Arsenous oxid	
Lead	*Bismuth Compounds*
Contained in paints of all kinds	Used in the treatment of syphilis
Lead Arsenate	

lead and silver; arsenic, bismuth and antimony; copper and zinc, as well as all other metals that belong to these groups.

Therefore, this method of treatment is based on the absolute fact that sodium thiosulphate will not only neutralize those metallic poisons which are free in the

* Read before the section on Dermatology and Syphilology at the Seventy-Fifth Annual Session of the American Medical Association, Chicago, June, 1924.

intestinal tract, but that it has the far more important action of rendering those substances soluble and excretable which have been taken up by the body and have been tightly bound by a protein radical.

Theoretically, sodium thiosulphate should be successful in the poisoning from Paris green, lead arsenate and any other compound containing mercury, lead or arsenic, or their compounds, or the compounds of two or more of these metals. It has so been proved.

METHOD OF ADMINISTRATION

When these metallic poisons have been given intravenously or intramuscularly, the sodium thiosulphate is given intravenously in not more than 20 c.c. of distilled water for each dose, every day for four days, and then every other day for as many doses as are necessary to complete the cure.

The original dosage that we employed has been found to be the best, 0.3, 0.45, 0.6, 0.75, 0.9, 1.2 and 1.8 gm. When the metallic poison has been taken by mouth, the stomach is washed out with 500 c.c. of water to which has been added 30 gm. of sodium thiosulphate. A similar amount is then given by mouth and allowed to remain in the stomach. The same procedure as described above is then carried out. When mercuric chlorid is placed in the vagina, 5 per cent sodium thiosulphate douches should be used in order to neutralize any free mercury, and then hydrous wool fat ointment, to which 1 per cent. sodium thiosulphate has been added, is applied.

Warning signs and symptoms of impending disaster are:

(*a*) Itching of the palms of the hands and soles of the feet or a generalized pruritus.

(*b*) Violent reactions lasting more than six hours and leaving the patient pale, cyanotic, listless, with muscles sore, with a metallic taste in the mouth, and unable to take food.

(*c*) Scarlatiniform, rubelliaform or dermatitis venenata-like eruptions, occurring from twenty-four to seventy-two hours after administration. (If one more injection is given, the patient will invariably develop arsenical dermatitis).

(*d*) Nervousness and loss of weight.

(*e*) Hemorrhages from the upper and the lower intestinal tract. Also hematuria.

Factors that predispose to this condition are:

(*a*) Individual eliminative power for arsenical compounds. It is impossible for anyone to prognosticate this condition unless a liver function test is made.

(*b*) Liver injury of any kind, manifested by jaundice, whether it be due to syphilis, cirrhosis, cancer, hepatitis, cholecystitis or cholelithiasis.

(*c*) Focal infections, such as infected teeth, tonsils, sinus, and asthmatic conditions.

(*d*) Acute febrile infections.

(*e*) Acute or chronic nephritis.

(*f*) Arteriosclerosis.

(*g*) Pernicious anemia.

CHEMOPATHOLOGY

Arsenic.—In cases of arsenical dermatitis it has been proved that the liver and skin bear the brunt of the injury. Cases that have come to necropsy show degrees of liver injury varying from cloudy swelling, to acute yellow atrophy and massive necrosis. The presence of arsenic has been demonstrated in the liver, skin, desquamated scales, blood and urine of patients who had these manifestations, days and weeks after the administration of arsenic compounds.

It is very probable that following the administration of arsphenamin, the arsenic is retained in the liver and fixed tissue cells for a long period of time, and is fed to the sensitive skin. Successful treatment depends on the ability of the therapeutist to neutralize this arsenic by some chemical. We believe that sodium thiosulphate does this very thing. Meyers has shown that there is an increased elimination of arsenic in the form of the salt of thiosulphuric and after the administration of sodium thiosulphate.

Kidney findings are really secondary to the liver saturation. The kidney seems to be peculiarly tolerant to arsenic, since nephritis is not an important complication of arsphenamin dermatitis, as shown by the fact that urine shows but little albumin, occasional casts, and a few red blood cells; and these findings are not constant.

The peripheral nerves are susceptible to arsenic, and show varying manifestations from tingling and numbness of the hands and feet to actual paralysis.

Mercury and Lead.—These two metallic poisons have a selective action on the kidney and intestinal tract, producing varying degrees of tubular nephritis, hemorrhage from the intestine, and violent enteritis. Lead, in addition, produces an anemia by its destructive action on the red cells and the blood-forming tissues; also a peripheral neuritis causing the characteristic paralysis.

Arsphenamin Dermatitis.—Twenty-five cases have been treated. In this series there has been one death. The necropsy in this case showed that the iliac arteries were thrombosed from the bifurcation downward.

Three cases will be cited.

CASE 1. (Reported by Dr. W. M. Ketchum, Kansas City, Mo.).—Mrs. M., seen in January, 1924, complained of asthma. The Wassermann test was positive +++. A diagnosis of syphilitic asthma was made. February 13, neo-arsphenamin, 0.3 gm., was given; February 19, 0.45 gm.; March 1, 0.6 gm. March 5, the patient complained of itching of the skin. On the advice of several physicians, she was given 0.6 gm. of neo-arsphenamin. March 11, the patient called her physician, who found that she had a generalized rubellaform rash over the entire body. Within twenty-four hours, the skin of the legs and buttocks was markedly thickened and infiltrated. The patient was given 0.6 gm. doses of sodium thiosulphate at six hour intervals, twenty-four hours elapsing between the third and fourth injections. Repeated check of the urine failed to show any kidney involvement. At the end of ten days the patient was able to resume her work, and incidentally, was relieved of her asthma.

CASE 2.—W. B., a negro, developed edema and redness of the skin following the fourth injection of neo-arsphenamin, which soon progressed to marked swelling of the head, face and entire body. This condition was accompanied by exudation of serum. He was given five doses of sodium thiosulphate during a period of ten days, with complete recovery from the arsenical dermatitis in three weeks. This case, unlike the majority, showed marked kidney involvement. Repeated examination of the urine showed that there was probably a primary condition which antedated the administration of arsenic.

CASE 3.—Mrs. M., aged 42, received four injections of neo-arsphenamin. Following the fourth injection, she complained of a sore mouth. Examination revealed an intense stomatitis. This was followed in forty-eight hours by a confluent rubellaform eruption, with marked edema and exudation of serum. There was also severe diarrhea, and she passed several long, membranous casts, which were the desquamated mucous membrane of the intestines. She received a total of eight injections of sodium thiosulphate (0.6 gm.) during a period of three weeks, at which time she left the hospital in good condition. She was seen two years later and apparently was in excellent health.

Jaundice Due to Arsenic.—In all the ten cases of this condition, it promptly disappeared under treatment with sodium thiosulphate. There have been no cases of acute yellow atrophy.

Arsenical Neuritis.—The mild cases, manifested by tingling and numbness of the extremities, promptly disappear under treatment, but in the more severe ones, in which there is definite paralysis, some weeks are required for recovery. One patient with evidently transverse myelitis, with paralysis of both legs and bladder following the twelfth dose of arsphenamin, completely recovered all the functions in three weeks under the sodium thiosulphate regimen.

Arsenous Oxid.—Dr. Tom Twyman of Independence, Mo., reports three cases of white arsenic poisoning.

The patients were a mother, aged 34, a son, aged 9, and a daughter, aged 4. The mother purchased 25 grains (1.6 gm.) of white arsenic on the pretext of poisoning rats. She stirred 20 grains (1.2 gm.) in cream of wheat and divided it into three equal portions, one of which she ate herself, giving the other two to the children. The girl refused to eat the porridge, so the mother stuffed the remaining 5 grains (0.3 gm.) in a piece of candy, and gave it to the child. Dr. Twyman was called in an hour and gave each of the patients an ounce of sodium thiosulphate by mouth. He gave the mother 1 gm. intravenously and each of the children 0.6 gm. This intravenous dosage was repeated daily for three days. All the patients recovered and are in perfect health. The only symptom of the arsenic poisoning in the mother was a severe diarrhea and cramps and, in the boy, chalky stools.

Mercurial Poison.—It is a well known fact that mercuric chlorid is nearly always fatal if taken in doses of 7½ grains (0.45 gm.) or more on an empty stomach. In more than forty cases treated by this method in the Kansas City General Hospital, under the direction of Dr. W. B. Campbell, and physicians in private practice, the mortality was less than 10 per cent. These patients had taken from one to thirty tablets (7½ grains [0.45 gm.] each).

The method of treatment is slightly different from that used in arsenic poisoning. It is well illustrated by the following case:

Mrs. B., a patient of Dr. Abe Miller of Kansas City, placed two 7½ grain (0.45 gm.) tablets of mercuric chlorid in the vagina. Two hours later, she was seized by violent intestinal cramps and had a passage of bloody stools. The vulva was especially swollen. The vaginal tract was douched with a 5 per cent. solution of sodium thiosulphate as well as the swollen parts would permit. Hydrous wool fat to which this chemical was added was forced into the vaginal orifice. She was immediately given 1 gm. of sodium thiosulphate intravenously, followed six hours later by a similar injection and twelve hours later by a third injection. Daily doses of a smaller amount were given until a total of six doses were injected. Red blood cells and albuminous casts found in the urine disappeared in a week, and the patient made an uneventful recovery.

Mercurial Stomatitis.—Even the severe types resolve promptly to the intravenous administration of sodium thiosulphate; the pain and discomfort usually disappear after the first treatment. Mercurial intoxication from intravenous or intramuscular injections can nearly always be controlled by sodium thiosulphate.

Lead Intoxication.—This type of metallic poison has always been one that resisted the best efforts of the therapeutists. In nearly all instances, both the acute and the chronic types resolve to this method of treatment. The technic of administration is the same as that in arsenical poisoning.

Dr. Nelse Ockerblad reports a case of acute lead poisoning showing red blood cells, albumin and casts in the urine, which cleared up on three intravenous doses of sodium thiosulphate.

A similar case was reported by Dr. Ralph Major, in which the result was excellent.

Dr. Lindsey Milne and Dr. Charles Nelson each report three cases, with similar results.

Bismuth Poisoning.—The treatment has been used in but one case, and that with success.

Dr. Henry C. Semon[1] of the Royal Northern Hospital, London, has reported two cases of bismuth stomatitis which cleared very quickly under this treatment.

CONCLUSIONS

1. Sodium thiosulphate is a highly efficient and rapid neutralizing agent for the common metallic poisons arsenic, mercury, lead and bismuth.

2. With this preparation available, it is possible to administer the maximum amount of treatment in syphilis with the assurance that, should metallic poisoning take place, it can be controlled.

3. Our experience has demonstrated that the original dosage is most efficacious and that the repeated administration of large doses at the onset shows no apparent advantage.

ABSTRACT OF DISCUSSION

DR. CHARLES C. DENNIE, Kansas City, Mo.: When Dr. McBride and I reported the orinigal work on the treatment of metallic poisoning, we believed that all heavy metals were precipitated as the sulphids by sodium thiosulphate and that they were so excreted. In this presumption we were wrong. These toxic metals are tightly bound by the fixed tissue cells, especially of the skin and liver, in the form of a metallic protein compound. These metals are literally pulled from the protein radical and made soluble by the sodium thiosulphate. Meyers of New York believes that the metals are converted into the salts of thiosulphuric acid and are so excreted in the urine. Ordinarily, these metals cannot be recovered from the urine, blood or cutaneous scales in any appreciable amount, but on the introduction of sodium thiosulphate intravenously comparatively large amounts of the particular metal makes its appearance in all of these sources, the ratio of excretion being increased from 300 to 1,000 per cent. In cases of suspected metallic poison, when no metal has been removed from the urine, sodium thiosulphate can be used as a diagnostic aid since it will increase the elimination of the metal if it is present. Meyers has proved beyond doubt that sodium thiosulphate increases the elimination of metals from the body in cases of metallic poisoning.

DR. OLIVER S. ORMSBY, Chicago: There is no doubt about the value of sodium thiosulphate in dermatitis exfoliativa due to arsphenamin. That has been the only disorder we have been interested in, because we have had no serious mercurial cases to treat. Dr. Mitchell and I have seen about fifteen cases of dermatitis exfoliativa, chiefly mild, since the original paper, and all have cleared up under this treatment, some within a week. Before we had this drug we were much concerned about a dermatitis exfoliativa, for those cases sometimes lasted many weeks. From six weeks to three months was the usual duration, and some cases did not respond at all to any method of treatment at our disposal. Now that we have this therapeutic agent, we feel that we have a method of treatment that will usually clear them up in a short time.

DR. JEFFREY C. MICHAEL, Houston, Texas: My experience with this drug conforms in every detail, so far as arsphenamin dermatitis is concerned, with what has been said. It is interesting to know that the drug has a good effect, even though a considerable period of time has intervened after the administration of arsphenamin. In one case, twenty-eight days had elapsed since the development of the dermatitis, and thirty-two days since the last injection of arsphenamin before sodium thiosulphate was begun. I have used larger doses than Dr. McBride and Dr. Dennie advocated in their first

1. Semon, H. C.: Brit. M. J. 2:662 (April 12) 1924.

paper without any ill effects, and it seems to me that the earlier doses may be increased. I have used as high as 1 gm. intravenously for the first dose. In one particular my experience does not agree with that of the author, and that is, in cases of mercurial stomatitis treated in this manner. In three cases so treated I have seen no effect from this drug. I thought I had an explanation for that until Dr. McBride said his results had been good. That explanation came to me from a study of Almkvist's investigations of the pathogenesis of mercurial stomatitis, in which he showed that it was due to mercurialization and anaerobic organisms. My explanation was that while the mercurial factor was taken care of by the sodium thiosulphate, the bacterial was not and the stomatitis continued. At present I am unable to understand our discrepant results.

DR. HAROLD N. COLE, Cleveland: I have seen quite a number of cases of dermatitis exfoliativa, and in all but one instance the action of this drug has been very gratifying. We have reached the point at which in a slight process, just beginning, with a little pruritus and eruption on the skin, we give a small amount by mouth. This will usually produce results. In one instance, in spite of this drug, there was a lethal termination. Our experience with mercurial poisoning of the chronic type has not been good. We have had several experiences with severe mercurial intoxication, and in none of these cases did the introduction of this drug intravenously or by mouth, have any effect on the condition.

DR. HENRY H. HAZEN, Washington, D. C.: I wish to report another use for sodium thiosulphate. If one is unfortunate enough to get an infiltration of the arm after an intravenous injection, an injection of from 2 to 5 per cent. thiosulphate into the infiltrated tissues will as a rule, greatly lessen the infiltration and pain that occur following the leakage of arsphenamin. This point is not generally appreciated, and I know that it is of extreme practical value.

DR. MILTON COHEN, Cleveland: I have been much interested in this subject because of the explanation that has been offered for the effect of the thiosulphate. When Dr. McBride advocated its use two years ago, it seemed to me that the explanation of how it worked was probably incorrect. Heavy metal poisoning is not due to the mere presence of a soluble metal salt within the cell, and the result following thiosulphate medication is not due to its precipitation as heavy metal sulphid. Rather, the cell is poisoned because of a combination of the heavy metal with the cell proteins, making heavy metal proteinate, and thiosulphate medication by mass action frees the cell protein from the heavy metal, making it again soluble and available for excretion. Kehoe succeeded in poisoning enzymes with mercury and silver salts and in precipitating out as insoluble scales the metal proteinate containing the enzyme. When these scales were shaken with distilled water, the water gave no test for mercury; but, on the addition to this suspension of any neutral salt, mercury appeared in the supernatant fluid and the enzyme activity was restored to 80 per cent. of its former activity. Sodium thiosulphate is particularly active in this regard. This is, in my opinion, the probable explanation of the action of this remedy. Dr. Hazen's remarks also will bear out this view. Finally, the fact that, following thiosulphate medication, there is an increased elimination of heavy metal also is in its favor.

DR. JAMES HERBERT MITCHELL, Chicago: Formerly we were constantly on the verge of loss of mind because of the danger of developing an exfoliative dermatitis. Now we have even ceased to worry much about it. In a few cases of central nervous system syphilis in which there was a complete intolerance, we have been able to carry on a certain amount of treatment by giving an injection of arsphenamin one day and of sodium thiosulphate the following day. We do not get much benefit, but we probably get a little. Our experience with stomatitis in the syphilis clinic has been very much better than that of some of the other speakers. I should also like to call attention to the fact that in a few cases of arsenical keratosis of the palms we have had some excellent results. When we used it we did not expect any results, but in two cases we got complete disappearance of the lesions and in other cases have had marked improvement.

DR. WILLIAM L. MCBRIDE, Kansas City, Mo.: I think we have brought something to the profession that is worth while, and I know that you agree with me. Those who have had failures from the administration of this drug in stomatitis I think may have used too large doses. Some will start on a 1 gm. dose immediately; but we have found this not so effective as to begin with smaller doses and gradually work up, and it has very rarely been necessary to go above 0.6 gm. I have been asked about the toxicity. It is nontoxic up to 2 gm. given intravenously.

CESSATION OF DIABETES INSIPIDUS ON ROENTGEN-RAY TREATMENT OF PITUITARY GLAND

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Diabetes insipidus is a rare disease, which was defined by Frank as a long continued abnormally increased secretion of non-saccharine urine that is not caused by a diseased condition of the kidneys. The combined statistics of Fitz,[1] Rowntree [2] and Williams,[3] based on more than 3,000,000 hospital admissions, give an incidence of 16.5 per hundred thousand. Marañon [4] has personally observed fifty-one cases.

The cause of diabetes insipidus is not definitely known. The anatomic evidence points to a lesion involving the stalk or posterior lobe of the pituitary gland. Kennaway and Mottram [5] found no record of a case of diabetes insipidus in which abnormality of the pituitary gland was excluded with certainty by postmortem examination. The lesion may be tumor, gumma, tubercle, basilar meningitis, gunshot wound, or fracture across the middle fossa of the skull. The experimental work of Cushing [6] showed that an enduring polyuria could be produced in dogs by division of the pituitary stalk, with or without partial removal of the gland. These anatomic and experimental findings have been interpreted as meaning that diabetes insipidus was caused by suppression of the secretion of the epithelial portion of the posterior lobe and stalk. Camus and Roussy,[7] however, conclude from their experiments that a superficial lesion of the base of the brain in the region of the tuber cinereum, and not a lesion of the pituitary gland, causes polyuria in the dog. Certain clinicopathologic reports, as that of Lhermitte,[8] are cited in support of this view.

The treatment of diabetes insipidus has been unsatisfactory. Cures have been reported after the use of various drugs, such as ergot,[9] following spinal puncture,[10] and as a result of antisyphilitic treatment.[11] Some polyurias of traumatic origin have stopped after a time, presumably because of healing of the damaged pituitary gland. But most patients fail to respond to these methods of treatment, and one must rely on the

1. Fitz, Reginald: A Case of Diabetes Insipidus, Arch. Int. Med. 14:706 (Nov.) 1914.
2. Rowntree, L. G.: Oxford Medicine 4: 179, 1921.
3. Williams, J. R.: Endocrinology and Metabolism, New York, D. Appleton & Co. 4:861, 1922.
4. Marañon: Rev. neurol. 38:691 (June) 1922.
5. Kennaway, E. L., and Mottram, J. C.: Quart. J. Med. 13:225 (April) 1919.
6. Cushing, Harvey: Boston M. & S. J. 168:901 (June) 1913.
7. Camus, J., and Roussy, G.: Presse méd. 22:517 (July) 1914.
8. Lhermitte, J.: Ann. de méd. 11:89 (Feb.) 1922.
9. Da Costa, J. M.: M. News 60:5 (Jan.) 1892.
10. Herrick, J. B.: Report of a Case of Diabetes Insipidus with Marked Reduction in Amount of Urine Following Lumbar Puncture, Arch. Int. Med. 10:1 (July) 1912.
11. Spanbock, A., and Steinhaus, J.: Neurol. Centralbl. 16:491 (June) 1897.

antidiuretic effect of subcutaneous administration of extracts of the posterior lobe of the pituitary gland. It is an established fact that the relief from this palliative treatment is usually prompt, but of short duration, never lasting more than twenty-four hours.

Roentgen-ray treatment of pituitary tumors has occasionally produced amelioration of symptoms of increased intracranial pressure and of pressure on the optic chiasm. Béclère [12] reported on one patient who thirteen years after treatment was begun, retained markedly improved vision, and remained free from headache and vomiting. I have observed several successful results; the most striking of these has been briefly reported by Newell.[13]

When the case of diabetes insipidus described below came under observation, it seemed that these anatomic, experimental and clinical facts might, theoretically, offer a prospect of cure on this basis: If the polyuria was due to a tumor in the region of the pituitary stalk, and if roentgen-ray therapy would cause recession of the tumor, the polyuria might cease. I have not been able to find in the literature a case of diabetes insipidus treated with the roentgen ray.

REPORT OF CASE

History.—A white man, aged 33, unmarried, a restaurant cook, seen in March, 1921, through the kindness of Dr. H. C. Naffziger of San Francisco, contracted dysentery in 1913, and had several recurrences up to 1920, when a prolonged course of treatment apparently resulted in a cure. He could not remember any serious trauma to the head. The family history was negative. The patient stated that he had not had syphilis. Six Wassermann tests of the blood had been negative. Abnormal thirst and excessive excretion of urine began in 1918. Two recent twenty-four hour amounts had measured, according to the patient, 14 and 15 quarts. He voided from six to ten times each night. He drank three or four 6-ounce glasses of water at a time. He complained of weakness, nervousness and marked irritability. Any attempt to restrict the fluid intake increased these symptoms. Mild bifrontal headaches had occurred frequently for a year. His weight

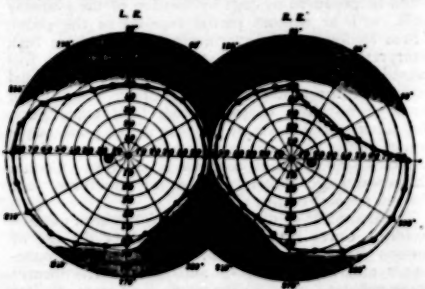

Fig. 1.—Visual fields before roentgen-ray treatment; 5 mm. white object.

in November, 1920, was 149 pounds (68 kg.); in March, 1921, 132 pounds (60 kg.). For a year he had used heavier clothing and bed covering than that to which he had been accustomed. Sexual desire and function were normal. No loss of vision had been noted. He was not drowsy, and slept not more than seven hours a night.

Examination.—The patient was thin, well muscled and of normal configuration, and weighed 132 pounds (60 kg.). The right pupil was larger than the left; both were regular and reacted to light and in accommodation. The optic disks were normal. The visual acuity was 20/20 in each eye. The visual fields showed a constant defect in the right upper temporal quadrant (Fig. 1). The distribution of hair and the condition of the external genitalia were normal. Aside from the eye findings, the visceral and neurologic examinations were negative. Roentgenograms of the skull showed a sella 11 cm. in length and 9.4 cm. in depth, without erosion or deformity. This was considered to be within normal limits. Numerous examinations of the urine showed a specific gravity of from 1.001 to 1.003, acid reaction, albumin absent or in very small amount, sugar absent and sediment negative. No amebas were found in the stool. The spinal fluid was under normal

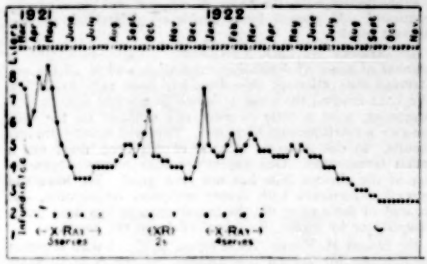

Fig. 2.—Urinary output from March, 1921, to November, 1922.

pressure, contained two leukocytes per cubic millimeter, and gave a negative Wassermann reaction in all dilutions. The temperature was normal and the pulse averaged 66.

In brief, the patient was incapacitated by excessive thirst, urinary frequency, loss of weight and strength, and marked irritability. There was a constant defect in the upper temporal quadrant of the right visual field. The diagnosis was: early pituitary tumor causing visual field defect, and diabetes insipidus.

Treatment and Results.—Figure 2 is a graphic chart of the patient's output of urine over a period of twenty months, from March, 1921, to November, 1922. The first four measurements were taken on successive days in the hospital, and they showed the slight drop, from 7,500 to 6,000 c.c., that followed intramuscular injection of 1 c.c. of pituitary extract. Thereafter the chart records the output of one day each week as measured by the patient.

The treatments were carried out in the Department of Roentgenology of Stanford University Hospital by Dr. W. E. Chamberlain and Dr. R. R. Newell. The first series was given, April 11 to 14, inclusive. On each day, three different areas in the right and left frontal and temporal regions, each area 2 inches square, were treated with three-fourths erythema dose at 10 inches distance, with a 10 inch spark gap and a 5 mm. aluminum filter. Thus, a series of treatments covered 24 square inches of scalp. The second series, May 9 to 12, was the same; the third to the eleventh series differed only in that four areas were treated on three successive days.

Following the first series of treatments there was no change in the clinical condition of the patient, and on May 2 he voided 8,500 c.c. of urine, which was the largest measurement during the time he was under observation. After the second series there was a drop to 4,500 c.c., May 29, and the decrease continued after the third series to 3,500 c.c., June 12, 19 and 26 and July 3. June 10, the patient reported that he weighed 142 pounds (64 kg.), a gain of 10 pounds (4.5 kg.), and that he was stronger and less nervous. July 15, he weighed 146 pounds (66 kg.). He was sleeping eight hours without voiding, and he drank only one glass of water at a time. He appeared more active and much more cheerful. The visual fields, charted July 15 and 16, failed to show any defect in the right upper temporal field. The fields were entirely normal. The patient returned to work at this time. During July and early August he remained at work, and his output was constant at 4,000 c.c.; but after that the measurements rose, and his weight fell to 138 pounds (63 kg.), August 10.

12. Béclère, A.: Rev. neurol. **30**:808 (June) 1922.
13. Newell, R. R.: Surg. Clin. N. Am. **3**:775 (June) 1923, Case 7571, p. 777.

October 2, the output had risen to 6,500 c.c. He was drinking three glasses of water at a time, and voiding two or three times at night. His hands were shaking and he looked worried and unhappy. He stopped work at that time.

The sixth and seventh series of roentgen-ray treatments, in October and November, gave results precisely similar to those which followed the earlier series. The output came down to 3,500 c.c., November 27, and he returned to work. December 13, he had a second and more severe recurrence. He voided eleven times that night, three times during the night of December 14, and then once a night through to the 18th, when the output was 5,000 c.c. Again, December 19, 20 and 21, he voided at least fifteen times each night and could not sleep. On the night of December 25 he voided four times, and the output for that twenty-four hours was 7,500 c.c. Unfortunately, there is no record for December 13, 19, 20 or 21, because he was too prostrated to save the urine; but it is his impression that on each of these days he passed at least twice as much as the 7,500 c.c. of the 25th.

The eighth to eleventh series were given in January, February, March and April, 1922. During that time the output did not go below 4,500 c.c., but the decrease continued to 4,000 c.c. in July; 3,000 c.c. in August, and finally to 2,500 c.c., September 17. For eight weeks after that time the output remained constant at 2,500 c.c. From the middle of November onward he considered himself cured, and stopped making regular weekly measurements. Subjectively, he was weak and nervous until March, when he returned to work. Throughout the summer of 1922 he worked nine hours a day and felt better than he had for years. His weight rose to 155 pounds (70 kg.) in September.

During 1923 and the early part of 1924 he has worked steadily except for two rest periods of six weeks each, which are customary in his trade. April 24, 1924, he wrote: "The line of work which I follow calls for speed, memory and workmanship. Very little manual labor is necessary. . . . I measured the output of urine, as you requested, April 20, 21 and 22. The amounts were 94, 92 and 87 ounces [2,780, 2,725 and 2,575 c.c.]. . . . I get up once at night to urinate." The average output of three successive days, over three years after treatment was begun, was 2,695 c.c.

COMMENT

This patient suffered from diabetes insipidus, associated with one definite sign of a lesion in the vicinity of the optic chiasm—a defect in the upper temporal quadrant of the right visual field. Syphilis, tuberculosis and fracture of the skull appeared to be eliminated as possible causative factors. Measurements of the sella showed it to be at the upper limits of normal. A diagnosis of pituitary tumor was made, and the patient was treated by roentgen-ray crossfire to the pituitary region, in hope of causing recession of the tumor. Three months later the visual fields had returned to normal and have remained so. The urinary output dropped from about 8 liters to about 3.5 liters in the first three months; there was a recurrence at the fifth month which again appeared to respond to the roentgen ray; and there was another recurrence and similar, though slower, response beginning in the eighth month. Seventeen months after treatment was started, the output dropped to 2.5 liters, and it has remained at about that point until the present time, over three years after the patient came under observation. Very striking improvements and relapses in the physical and mental condition of the patient coincided with the drops and rises of the urinary output. The net result, clinically, is that a totally incapacitated man has become an efficient wage-earner.

Is it correct to conclude that the diabetes insipidus in this case was caused by a tumor in the region of the optic chiasm, and cured by roentgent-ray treatment of the tumor? No other treatment of any kind was given to this patient. The unexplainable cures of this disease, following spinal puncture and the administration of various drugs, urge caution in interpreting the disappearance of polyuria. But the diagnosis and the method of treatment seem theoretically sound, and the response of both recurrences to further treatment was very striking. Moreover, the confirmatory evidence of disappearance of a quadrant defect in the visual fields following the first roentgen-ray series is most important, for this defect was certainly caused by a lesion in the neighborhood of the optic chiasm, and it is known that field defects sometimes improve or disappear following roentgen-ray treatment of pituitary tumors.

It seems proper to conclude, therefore, that in this case the evidence suggests a cure of diabetes insipidus as a result of recession of a pituitary tumor under roentgen-ray treatment.

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ANTISYPHILITIC ACTION OF BISMUTH *

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Since the first report by Sazerac and Levaditi [1] on the antisyphilitic action of bismuth, this subject has attracted widespread interest. Of the numerous papers on this subject, not one has disputed the fact that this metal has a spirocheticidal action in syphilis of man and experimentally infected animals. There is, however, much uncertainty as to its exact place in the therapy of syphilis.

The questions at present in the balance are: the relative value of bismuth as compared with other antisyphilitics, the most effective compound, the dosage, the type of cases in which it should be used, and the correlation of bismuth therapy with other forms of treatment in the same patient.

To decide these questions, it seems necessary to obtain more accurate data as to the dosage in experimental animals, more prolonged observation of cases treated by the drug, and a better understanding of its toxicity, its rate of absorption, and its excretion.

I shall present some observations on the comparative action of a few typical bismuth preparations in animals, and a brief report of experience with bismuth in the clinic, which I hope may aid to an understanding of the value of this new antisyphilitic drug.

PREPARATIONS USED

In a previous report,[2] I confirmed the work of Sazerac and Levaditi and others that bismuth salts caused the disappearance of spirochetes from and the healing of lesions in rabbits in amounts far below the toxic doses.

In selecting a drug for use in the clinic, it seemed necessary to compare the effectiveness in experimental animals of some of the more promising compounds. I selected for this purpose potassium and sodium bismuth

* Read before the Section on Pharmacology and Therapeutics at the Seventy-Fifth Annual Session of the American Medical Association, Chicago, June, 1924.

† From the Department of Bacteriology, Columbia University, the Medical Clinic of the Presbyterian Hospital, and the Department of Medicine, Columbia University College of Physicians and Surgeons.

‡ This article is abbreviated in THE JOURNAL by the omission of historical data and references. The complete article appears in the Transactions of the Section and in the author's reprints. A copy of the latter will be furnished by the author on request.

1. Sazerac and Levaditi: The Therapeutic Action of Bismuth on Syphilis, Ann. de l'Inst. Pasteur 36:1, 1922.
2. Hopkins, J. G.: Bismuth in the Treatment of Syphilis, Arch. Dermat. & Syph. 7:745 (June) 1923.

tartrate, precipitated bismuth in fine suspension (the two forms chiefly used by Levaditi and his co-workers) and also bismuth iodoquinate and bismuth hydroxid, both of which have been used extensively by others.

The preparation of the first named drug, I have already described.[2] The precipitated bismuth was prepared by neutralizing quadruple strength Nylander's solution and reducing this by the addition of glucose at a temperature of from 90 to 100 C. The fine precipitate so obtained was washed by sedimentation from physiologic sodium chlorid solution and resuspended in saline solution to form 10 or 20 per cent. suspension by weight. It might be added that, to obtain satisfactorily fine particles, it was found necessary to precipitate in a nearly neutral and not in a strongly alkaline solution, and to avoid drying and regrinding the precipitated bismuth. Bismuth iodoquinate was prepared by treating solutions of bismuth oxychlorid in dilute hydrochloric acid with quinin sulphate and potassium iodid. The precipitate was filtered, washed, dried, ground and suspended in olive oil. The bismuth hydroxid used was a commercial product in fine powdered form, also suspended in olive oil.

TEST ANIMALS

As test objects we used rabbits infected in the testis or scrotum with three strains of spirochetes: one isolated in this laboratory in 1913 from a condyloma of the anus; one isolated by Nichols in 1912 from human spinal fluid, and one isolated during the past year from a condyloma. The doses to be tested were injected into the erector spinae muscles. There was no marked difference in the action of bismuth on these three strains.

CURATIVE DOSE

In determining the curative dose, the presence of spirochetes in the lesions and disappearance after treatment was proved by dark-field examination. The treated rabbits were held as long as laboratory conditions permitted, to observe the healing of the lesions and to watch for the occurrence of relapses.

It was impossible, however, to keep most of our animals alive long enough to make sure of permanent cure, and for the purpose of our studies we considered a disappearance of spirochetes during the first week and the healing of all testicular or scrotal lesions that existed at the time of treatment as a cure.

The results were remarkably consistent, in view of the difficulty of measuring accurately a small dose of an insoluble drug suspended in oil, and I feel that we can speak of the minimal curative dose in the sense stated with some accuracy. Astonishingly small amounts were found effective, and we accepted these small doses as curative only after frequent repetition of the test. For the tartarobismuthate we obtained the disappearance of the spirochetes and healing in a dose of 2 mg. per kilogram in all animals tested except one which was injected during a latent stage and which later showed a relapse.

For precipitated bismuth, 4 mg. per kilogram was found constantly a curative dose; 3 mg. cured in one instance, and 2 mg. failed to cure.

I have checked these tests of my own with commercial preparations of bismuth tartrate and precipitated bismuth and found the same doses curative: 2 mg. and 4 mg., respectively.

The curative dose for bismuth iodoquinate and hydroxid are slightly larger than for the two first named preparations, and approximately 8 mg. and 5 mg., respectively. We have not treated a sufficient number of animals to determine the doses precisely. It should be emphasized that these doses are much smaller than those usually given. No accurate titrations seem, however, to have been published, and it seems certain that the customary statement,[3] that the curative dose of the bismuth tartrate is about 50 mg. per kilogram, gives an inadequate idea of the effectiveness of this drug.

MAXIMUM TOLERATED DOSE

For the purposes of these experiments, we have considered animals that survived a month as resisting the action of the drug. A number maintained good health for from three to seven months after large injections.

Precipitated bismuth was the least toxic, and was well borne in doses up to 400 mg. per kilogram; some animals survived 500 and 700 mg. for long periods (Table 1).

Bismuth tartrate is stated by Levaditi [1] to be tolerated up to 200 mg. per kilogram. One animal to which we gave this dose of a commercial preparation died in two weeks. Of ten rabbits given 100 mg. per kilogram of our preparation, six died within the month and four survived, one of them for four months. Some animals also died after injections of 75 and 50 mg., but we have considered 75 mg. as approximately the tolerated dose.

For bismuth hydroxid and bismuth iodoquinate, the values found were about 300 mg.

TABLE 1.—*Precipitated Bismuth: Determination of Therapeutic Index in Syphilitic Rabbits by One Intramuscular Injection*

Dose per Kilogram, Mg.	Number of Rabbits	Result	Period of Observation
		Therapeutic Tests	
8	1	Healed	7 months
4	3	Healed	2-3 months
3	1	Healed	3 months
2	1	Healed and relapsed	1 month
2	1	No effect	1 month
1	1	No effect	1 month
		Tolerance Tests	
1,000	1	Died	4 days
700	1	Survived	1 month
500	1	Died	1-2 weeks
	1	Survived	4 months
400	2	Survived	1-5 months
300	1	Survived	4 months
100	5	Survived	7-8 months

Curative dose, 1 mg. per kilogram.
Approximate tolerated dose, 400 mg. per kilogram.
Approximate therapeutic index, 1 : 400.

In the tolerance tests there were many irregularities, to which two factors contributed. One was that deaths from intercurrent infection occur unavoidably in animals held for long observation, and some of these may have been recorded as due to the injected drug. A more important factor is the slow and irregular absorption of insoluble compounds or suspensions in oil injected into the muscles. Myers and Corbitt [4] found that the greater part of the insoluble bismuth compounds injected into rats could later be recovered unabsorbed at the site of injection. In our rabbits which received large injections, we have found intramuscular deposits of what appeared to be bismuth as late as three months after treatment.

It must be recognized that the amount of drug absorbed and effective may be much less than the amount injected, especially when large doses are given. It is known that bismuth solutions given intravenously are from ten to twenty times more toxic than when given intramuscularly.[5]

This should be remembered in comparing such toxicity tests with toxicity tests for the arsphenamins. The high tolerance of animals for the bismuth compounds given intra-

2. Sazerac and Levaditi (Footnote 1). Klauder, J. V.: Bismuth in the Treatment of Syphilis, Arch. Dermat. & Syphilol. 7:721 (June) 1923. Bismuth Preparations in the Treatment of Syphilis, J. A. M. A. 81:661 (Aug. 25) 1923.
4. Myers, C. N., and Corbitt, H. B.: Am. J. Syph. 7:352 (April) 1923.
5. Sazerac and Levaditi (Footnote 1). Citron, J.: Med. Klinik 19:1279 (Sept. 23-30) 1923.

muscularly is, however, an indication of the safety of treatment of human beings by the same method.

THERAPEUTIC INDEX

On the basis of these tests, we have estimated the therapeutic indexes as approximately 1:100 for precipitated bismuth, 1:37 for bismuth tartrate and iodoquinate, and 1:50 for bismuth hydroxid.

EXPERIMENTAL RESULTS

The values found for these bismuth preparations are far higher than any recorded estimations for arsenical or mercurial drugs tested in rabbits (Table 2). They

TABLE 2.—*Comparison of Therapeutic Indexes of Bismuth and Other Antisyphilitic Drugs*

Preparation	Curative Dose, Mg. per Kilogram	Approximate Tolerated Dose, Mg. per Kilogram	Approximate Therapeutic Dose
Potassium and sodium bismuth tartrate	2	75	1 : 37
Precipitated bismuth	4	400	1 : 100
Bismuth iodoquinate	8 (approx.)	300	1 : 37
Bismuth hydroxid	5	300	1 : 60
Arsphenamin (intravenous)*	15	100	1 : 7
Neo-arsphenamin (intravenous)*	11	900	1 : 80
Mercuric salicylate (intramuscular)	15	6	2½ : 1
Phmerin (intravenous)†	20	20	1 : 1

* Castelli: Etschr. f. Immunitätsforsch. 1 : 221. 1913.
† White, E. C.; Hill, J. H.; Moon, J. E., and Young, H. H.: J. A. M. A. 79 : 877 (Sept. 9) 1922.

are strictly comparable to tests of insoluble mercury compounds, and leave no doubt that bismuth is far more effective than mercury under experimental conditions.

In regard to its apparent superiority to arsphenamin, I would make two reservations: one already referred to, that the amount of bismuth absorbed in the toxicity tests is uncertain; another, that a comparison between the effect of a single intramuscular injection which is slowly absorbed over a long period, and that of a single intravenous injection which is quickly excreted and effective over a very short period, does not give a precise estimate of the comparative value of the two drugs. The results are sufficient, however, to convince one that bismuth is experimentally a highly effective antisyphilitic agent.

Comparing the four bismuth compounds with one another, the soluble bismuth tartrate was curative in smaller amounts than the insoluble preparations. Precipitated bismuth, however, had distinctly the best therapeutic index. It would appear, then, the most promising for therapeutic use; but its superiority cannot be accepted unless confirmed by clinical experience.

It is suggestive to compare these experimentally determined figures with the doses used in clinical treatment. The usual therapeutic dose of bismuth tartrate is 200 mg., which is 100 times the curative dose per kilogram and three times the tolerated dose for rabbits. The usual therapeutic dose of precipitated bismuth is 150 mg., which is thirty-seven times the curative dose for rabbits and less than half of the tolerated dose per kilogram. The maximum therapeutic dose of neo-arsphenamin is 900 mg., which is eighty-two times the curative dose per kilogram for rabbits, and three times the tolerated dose. The maximum therapeutic dose of mercuric salicylate is 130 mg., which is only nine times the curative dose per kilogram and twenty times the tolerated dose. This would lead one to expect that, in the clinic, bismuth would be about as effective as arsphenamin, and both more effective and less toxic than mercury.

CLINICAL RESULTS IN EARLY SYPHILIS

Fournier [6] and his co-workers found that bismuth treatment caused a prompt resolution of primary and secondary syphilitic lesions, with disappearance of spirochetes after the first to the third injection and later a clearing up of the Wassermann reaction. This has been repeatedly confirmed,[7] and I have found few reports of refractory cases. As compared with arsphenamin, no definite difference in action has been brought out. Many report the effect of bismuth to be less prompt. Levaditi [7] believes that relapses are less frequent after bismuth than after arsphenamin. My own experience is limited, as it does not seem justifiable at present to withhold arsphenamin from these patients. It is indisputable that the cases clear up under bismuth (Chart 1), but one such case has relapsed (Chart 2).

As compared with mercury, the bismuth effects are certainly more rapid.[8]

CLINICAL RESULTS IN LATE SYPHILIS

Tertiary cutaneous lesions also respond promptly to bismuth. After the active lesions have subsided, the effect of treatment can be followed only by serum tests. Tabulating 122 courses of bismuth given to patients with positive Wassermann reactions, a negative test was obtained in thirty-eight or 31 per cent., of the cases. Many patients could not be followed, but in only one of the cases which were strongly positive and in six weakly positive before treatment were persistent negative reactions obtained. The courses given averaged twelve weekly injections, but varied from four to thirty-two.

The most striking thing that we observed has been that in some patients, on whom prolonged treatment with arsphenamin and mercury had had no apparent effect, bismuth treatment weakened or made negative the Wassermann reaction, and in one or two such refractory cases the effect has persisted (Chart 3).

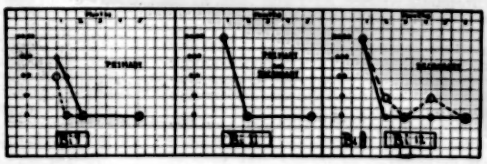


Chart 1.—Wassermann reactions in three cases of early syphilis treated with bismuth: dots and solid lines, reactions with plain alcoholic antigen; the circles and broken lines, reactions with cholesterinized antigen; rectangles below, period of treatment; figures within them, number of injections.

EFFECT IN SYPHILIS OF THE CENTRAL NERVOUS SYSTEM

Many favorable reports have been published as to the effect of bismuth treatment of syphilis of the central nervous system.[9] Citron [5] reports that its action is more marked than that of arsphenamin.

It is stated that bismuth, like other spirocheticides, is more effective in meningeal and vascular types of infection than in the parenchymatous forms. Little precise informa-

6. Fournier, L., and Guénot, L.: Ann. de l'Inst. Pasteur 36 : 14 (Jan.) 1922.
7. Sazerac and Levaditi (Footnote 1). Klauder (Footnote 3). McCafferty, L. K.: Bismuth in the Treatment of Syphilis, Arch. Dermat. & Syph. 3 : 469 (Oct.) 1923. Müller, H.: Zentralbl. f. Haut. u. Geschlechts Kr. 7 : 74, 1922. Biberstein, Z. H.: Deutsch. med. Wchnschr. 49 : 1519, 1923. Felke, H.: München. med. Wchnschr. 69 : 1781 (Dec. 29) 1922. Levaditi, C.: Lancet 1 : 639 (March 31) 1923.
8. Felke (Footnote 7).
9. Levaditi (Footnote 7). Marie, A.: Ann. internat. de neurol. 1 : 196, 1922.

tion is available, however, especially as to its effect on the tests of cerebrospinal fluid. We have found that in instances it relieves headaches, root pains and other irritative symptoms of tabes. In a few instances, it has weakened the Wassermann test on the spinal fluid. We hope to obtain more systematic observation on its use in these difficult cases, but at present it is necessary to reserve judgment.

BY-EFFECTS OF BISMUTH TREATMENT

In its use as an antisyphilitic, bismuth has been found to cause no poisoning dangerous to life. The most important by-effect is a stomatitis, which is described below.

More disturbing from the point of view of the patient are inflammations of the buttock. These may be accompanied by fever and malaise. Usually a careful injection of a good

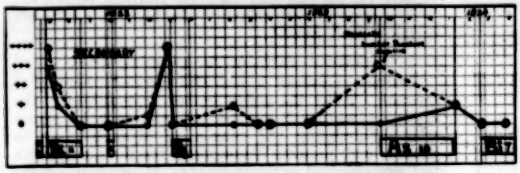


Chart 2.—Relapse after apparent bismuth cure in early syphilis; the symptoms and serum reaction cleared up after ten arsphenamin injections.

preparation is almost painless, but an extensive, hot, painful induration may occur several days after treatment. This is more frequent if the preparation is alkaline or if it contains coarse particles. Sterile abscesses also occur, sometimes a week or more after treatment. They are probably due to an escape of part of the injection between fascial planes where it cannot be absorbed. These reactions are distressing and disruptive of consecutive treatment, but leave no permanent effect. The next most frequent symptoms are urinary. Von Kollert found a diuresis, with degenerated renal epithelium in the urine, in a large percentage of his cases. Albuminuria is frequently reported, but I have found no cases of permanent kidney injury on record.

Skin eruptions are rare, but various types have been described and are listed in Müller's[1] article.[20] The commonest is a diffuse pruritic erythema with small miliaria-like vesicles. Müller includes in his report one case of dermatitis exfoliativa.

Betz[21] has reported a moderate secondary anemia in cases under treatment. One doubtful case of icterus is on record;[22] two cases of ulcerative colitis,[23] and occasional instances of diarrhea.

In my own series of 120 cases, in which 1,500 treatments were given, we had ten cases of stomatitis, eight cases of gluteal abscess, one generalized erythema, one case of circinate scaling lesions on the legs, which were ascribed to bismuth, and one case of jaundice, which was more probably due to arsphenamin previously administered. We detected no evidence of renal irritation on frequent urinary examination—perhaps because of the relatively small dosage employed. More than sixty injections in a period of six months have been given to a patient without producing any toxic symptoms.

BISMUTH STOMATITIS

Most patients under bismuth treatment develop a bluish black line along the alveolar border of the gums. The "bismuth line" is wider and more vaguely bordered than the "lead line." It causes no symptoms and is not permanent. With it there may be gingivitis—usually an exacerbation of an old pyorrhea. Mucous membrane pigmentation also occurs in other portions of the mouth, and may be extensive without causing symptoms. All degrees of irritation occur, from slight discomfort to a condition in which solid food cannot be taken. In the more marked cases there are moderate salivation and intense fetor.

The appearance of a frank bismuth stomatitis is astonishing. There are large black plaques, especially on the buccal mucous membrane along the line of the closure of the teeth. There is punctate pigmentation of the soft palate. The individual filiform papilla of the tongue may be pigmented, standing out as black specks, and on the under surface of the tongue lines of pigmentation may be seen along the veins, as marked as if the vessels had been injected with India ink. With this is a varied degree of ulceration especially frequent about the posterior molar teeth. In the ulcers are said to be found the spirochetes and fusiform bacilli of Vincent.

Even the most severe cases subside on cessation of treatment, and in the cases which we have followed for any length of time all traces of pigmentation have disappeared. Milian and Perin,[24] who have made the most careful study of this condition, report a stomatitis in 20 per cent. of their cases.

In treatment of the stomatitis, Fournier recommends applications of bismuth tartrate to combat the secondary spirochetal infection. Others have recommended solutions of neoarsphenamin. We have employed acriflavine in 1:1,000 dilution in severe cases. Satisfactory results can be obtained in most instances by the use of simple cleansing mouth lotions.

CONTRAINDICATIONS

It will be seen that, as compared with mercury or arsphenamin, bismuth is a drug of low toxicity. It should be administered with caution, however, in patients with renal lesions, with anemias or with colitis.

PLACE OF BISMUTH IN SYPHILIS THERAPY

In regard to the clinical use of bismuth on the basis of our present knowledge, it should certainly be used in

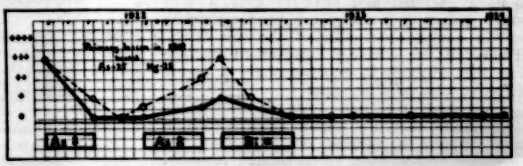


Chart 3.—A case refractory to arsphenamin cleared up by bismuth. This patient had received twenty-five injections each of arsphenamin and of mercury for a chancre three years before. He had a positive Wassermann reaction and was given sixteen more arsphenamin injections, with little effect. After bismuth, the reaction became negative and remained so.

cases which are intolerant to arsphenamin and mercury; and in cases which have not responded to thorough treatment by these drugs it offers a hope of cure. It seems, too, that we may go farther. There is a general agreement that bismuth is an effective spirocheticide, and practical unanimity among those who have used it that it is more effective than mercury. It seems advisable, then, that it should be included in the routine treatment of syphilis. A tentative scheme would be a course of arsphenamin treatment followed by a course of bismuth; after this, a second course of arsphenamin followed by a course of mercury. This program would be modified by those who prefer simultaneous treatment

20. Galliot, A.: Bull. Assoc. franç. d. dermat. **30**: 203, 1923.
21. Betz, F.: München. med. Wchnschr. **70**: 913 (July 13) 1923.
22. Jamselme, quoted by Müller (Footnote 7).
23. Ducrey, quoted by Müller (Footnote 7).
24. Milian and Perin: Bull. Soc. dermat., 1902, p. 37.

with different drugs. It should be emphasized that there is no evidence to justify the substitution of bismuth for arsphenamin in the treatment of early cases.

DOSAGE

As to dosage and course, most of the French clinicians have used relatively large doses, 0.2 gm. of bismuth tartrate, two or three times a week for six weeks, and equivalent amounts of the other preparations. The recent work of Levaditi and Nicholau and general clinical experiences, however, indicate that little is to be gained by excessive dosage, and in a drug as slowly absorbed as bismuth there seems little advantage in frequent injections. We believe that in most instances as good results can be obtained by weekly injections of 0.2 gm. of bismuth tartrate or of precipitated bismuth as by any more intensive methods at present at our disposal. These should be given in courses of from six to eight weeks, either accompanying or alternating with arsphenamin. The use of soluble preparations, by intravenous injection, is dangerous.

SUMMARY

1. Of four bismuth compounds tested in rabbits, potassium and sodium bismuth tartrate (soluble) has the smallest curative dose (2 mg. per kilogram).

2. Precipitated bismuth (insoluble) has the highest therapeutic index (1:100).

3. Under the experimental conditions, the bismuth preparations gave a higher index than do the arsphenamins or the mercurials.

4. In the clinic, the effectiveness of bismuth as an antisyphilitic approximates that of arsphenamin. It is more effective than mercury.

5. Insoluble bismuth preparations are the least toxic of spirocheticides.

6. Both bismuth and arsphenamin should be used in routine antisyphilitic treatment.

ABSTRACT OF DISCUSSION

DR. J. F. SCHAMBERG, Philadelphia: I am in substantial accord with the statements made concerning the place of bismuth in the therapy of syphilis. The value of any medical compound in the treatment of infectious diseases is related to its influence on the body cells and on the parasite. It requires a long period of time before the relative clinical value of any new drug can be established: it will doubtless take a period of years before we can exactly fix the status of bismuth in syphilotherapy. I believe, with Dr. Hopkins, that bismuth is superior to mercury. I have been employing bismuth for the past year or more in cases of syphilis, and my associate, Dr. Klauder, has extensively used this drug in my clinic ever since its introduction. We find that relatively small doses of bismuth are sufficient in the laboratory to effect the disappearance of spirochetes from experimentally infected rabbits. Bismuth, like mercury, however, has virtually no effect on trypanosomes. It is a most important matter, it appears to me, that we should have as many drugs in our attack on syphilis as possible. The spirochete may become resistant to arsenic or to mercury. In such cases, bismuth becomes an important agent. French authors have reported cases which have resisted arsenic and mercury not only as regards the Wassermann reaction, but also as far as the persistence of active lesions is concerned; these have healed under bismuth. I believe that the arsenobenzenes are of the greatest value in the early stages of syphilis, not only because of their greater curative power, but because of the speed with which they sterilize the superficial lesions and thus destroy the infectivity of the disease, thereby protecting the community. I believe that the best treatment consistent with safety in the light of our present knowledge is the use of organic arsenicals in moderate doses, combined with the employment of bismuth. We are using from 0.4 to 0.6 gm. neo-arsphenamin with 100 mg. of bismuth once a week. With respect to the after-effects of bismuth, much depends on susceptibility. We have been using potassium bismuth tartrate in oil, and the effects have been excellent. Most of the injections are painless. I believe that in the treatment of syphilis intramuscular injections, dose for dose, are therapeutically more active than intravenous administration.

DR. TORALD SOLLMANN, Cleveland: How much time is required for the bismuth black to disappear from the mucous membrane of the mouth?

DR. J. GARDNER HOPKINS, New York: In regard to dosage, there seems little reason for crowding with large doses. We get excellent results with relatively small amounts. The discoloration of the gums does not last. Its duration varies in individual cases; I should say that the average is from two to three months.

ALKAPTONURIA

REPORT OF CASE, WITH DISCUSSION OF URINARY REDUCING SUBSTANCES

BRUCE C. LOCKWOOD, M.D.
DETROIT

This case is reported not only for its rarity but also to call attention to the fact that not all urines which give a positive test for sugar with copper solutions are necessarily diabetic, but should be studied more thoroughly before instituting diabetic therapy.

REPORT OF CASE

History.—F. R., a foreman, aged 56, was referred to me, June 25, 1923, by his physician for insulin treatment, because of a supposed glycosuria that would not clear up under the Allen-Joslin system of starvation. The patient's mother had died of diabetes. He had three brothers living and well; one brother had had a gastro-enterostomy for ulcer. Two sisters were living and well, and one sister had a goiter. He had had diphtheria at 10 and malaria at 12 years of age. His habits were good; his venereal history was negative. He was married, with one child living and well. Once or twice every year for fourteen years he had had a period, lasting one or two months, in which he would have a gnawing pain with gas and belching and occasionally vomiting, coming on at irregular intervals, but usually from two to four hours after meals and relieved by meals, soda and vomiting.

He stated that sugar was discovered in the urine ten years previous and that he had dieted for this condition off and on since that time. Two months before, he had had an attack of grip, at which time sugar was again found in the urine, and since then he had been on a very strict undernutrition diet corresponding to a diet as outlined by Joslin's diet card. During this time he had lost 42 pounds (19 kg.), but had not become sugar free. There was a diminished appetite and no increase in thirst, but he urinated twice every night. His history was otherwise negative.

Examination.—The patient weighed 143 pounds (65 kg.). He was of moderate stature, well developed, but showed evidence of much loss of weight. The pulse, respiration and temperature were normal. The skin had a slightly yellowish tinge, more pronounced in the hardened areas, such as the palms and soles. There was some retraction of the gums; otherwise the physical examination was negative. The blood pressure was 120 systolic and 80 diastolic. The blood Wassermann reaction was negative. The blood count showed red blood corpuscles, 4,140,000; white blood corpuscles, 8,550; hemoglobin was 80 per cent.; differential, normal. The blood sugar was 0.08 per cent. The blood nitrogen was 24 mg. and blood uric acid 3 mg. per hundred cubic centimeters of blood.

The urine showed a specific gravity of 1.011; it was alkaline; there was no albumin; microscopic elements were negative; tests for bile, indoxyl, acetone and diacetic acid were negative. With Fehling's and Benedict's solution, a reddish black precipitate was formed, very suggestive of a sugar reduction, but atypical. A fermentation test showed that there was no sugar present.

A stomach analysis showed a normal motility and normal acidity.

Fluoroscopic examination showed the chest to be negative. A barium meal was then given, which revealed a normal gastro-intestinal tract, except for three cycle gastric peristalsis and a deformed and contracted duodenal cap.

Further Study.—The patient was transferred to Harper Hospital, where he was found to have a normal blood sugar curve after the ingestion of 100 gm. of glucose. His basal metabolic rate was 31.5 calories per square meter per hour (10 per cent. below normal). The respiratory quotient was 0.7.

The patient was given a full diet and at all times he kept a normal blood sugar. The urine persistently showed the atypical precipitate with Fehling's and Benedict's solution, but was negative with the fermentation test. The urine, when passed, was of normal color, but turned almost black on the addition of an alkali or on standing a few hours. On addition of a dilute solution of ferric chlorid, a deep blue color appeared for a moment, to reappear on addition of more of the reagent.

Recapitulation and Diagnosis.—These positive findings stand out: An adult gave a history suggestive of duodenal ulcer. This diagnosis was confirmed by roentgen-ray examination. In addition, he gave a history of having had some substance in the urine for ten years, which had been considered to be glucose by numerous physicians. He had been starved and dieted but never lost the urinary reaction. On closer study, the urine was found to be negative with the fermentation test and displayed the characteristics of alkapton. Further, he was found by the blood sugar curve method to have a normal glucose tolerance.

Additional questioning of the patient revealed that for as long as he could remember he had noticed that the urine frequently stained his underclothes a dark color, and that two of his sisters complained of the same thing.

The patient has been on full diet for more than one year, during which time he has regained his normal weight and strength and well being. During this time alkaptonuria has been always present. Repeated blood sugar and urinary fermentation tests have been done with negative findings.

ALKAPTONURIA

Alkaptonuria is an outward sign of a very rare anomaly of protein metabolism in which alkapton bodies, also known as homogentisic acid, are excreted in the urine. Homogentisic acid is a normal product of the catabolism of tyrosin and phenylalanin, which, in normal individuals, undergoes complete destruction. The condition is a rare recessive character in the mendelian sense, is usually congenital, and persists throughout life without any serious detriment to the health of its subjects.

Homogentisic acid can be synthesized in the laboratory. It has been found that 50 gm. of tyrosin is the tolerance of a normal person before excretion of homogentisic acid occurs in the urine.

Alkaptonic urine seldom exhibits any abnormality of tint when passed, but darkens quickly on exposure to air, undergoing changes, through brown to black, resembling closely those seen in melanuric urines. The two conditions, however, are easily distinguished by means of the ferric chlorid test. The addition of alkali causes very rapid darkening, and heat increases the rate of blackening. Homogentisic acid is a reducing agent and gives some of the reactions for glucose, but the alkali in the Fehling's and Benedict's solution gives a peculiar appearance to the reactions. It is optically inactive and does not ferment.

As an outcome of alkaptonuria, deep pigmentation of regions of the skin is often seen, with a blackening of the cartilages. This is known as ochronosis, and in many references alkaptonuria is included under this head; but there is a group of cases in which similar pigmentation results from long continued application of phenol (carbolic acid) to chronic ulcers. Joint changes are sometimes seen in alkaptonuria.

Brown and black urines may be seen in chronic jaundice, hematuria, hemoglobinuria, indicanuria, melanuria, alkaptonuria and carboluria, and after the administration of certain drugs, such as phenyl salicylate, the salicylates, resorcinol, gallic acid and uva ursi.

Other substances may appear in the urine at times suggesting a positive glucose test with the coppor solutions. Lactose and pentose reduce copper and form osazone crystals with phenylhydrazin, but do not ferment. Glycuronic acid gives the reactions similar to pentose, and it is this substance which probably causes the partial reduction often seen when patients have been taking certain drugs, such as phenyl salicylate, phenol, morphin, chloral, camphor, chloroform or benzoic acid.

CONCLUSIONS

All cases that show a positive or partially positive urine with the copper solutions in common use, i. e., Fehling's and Benedict's, should be more thoroughly studied before one concludes that the patient has diabetes and institutes strict treatment. Blood sugar estimations should be done, and if there is doubt, a glucose tolerance test, as well as a urinary fermentation and phenylhydrazin test.

While the majority of patients showing a positive test with Benedict's or Fehling's solution are diabetic and should be so considered till proved otherwise, all such cases should have the benefit of measures that exclude renal glycosuria, pentosuria, alkaptonuria and the urinary presence of glycuronic bodies, which often follows the taking of certain drugs.

2033 Park Avenue.

THE HEPATIC ANAPHYLATOXIN

STUDIED BY HEPATIC TRANSPLANTATION AND BLOOD TRANFUSION

W. H. MANWARING, M.D.
Professor of Bacteriology and Experimental Pathology, Stanford University School of Medicine
V. M. HOSEPIAN, A.B.
F. I. O'NEILL, A.B.
AND
H. BING MOY
STANFORD UNIVERSITY, CALIF.

In previous papers it was shown that characteristic anaphylactic contractions of the urinary bladder [1] and of the gastro-intestinal tract [2] do not take place in dehepatized anaphylactic dogs. The conclusion was drawn that the typical anaphylactic contractions of these organs are due to chemical products (hepatic anaphylatoxins) explosively formed or liberated by the anaphylactic liver, products having a histamin-like effect on smooth muscles. We have obtained additional evidence in support of this conclusion by hepatic transplantation and blood transfusion tests.

LIVER TRANPLANTATIONS

As a preliminary to transplantation experiments, it is shown that primary reactions between specific foreign protein and anaphylactic blood are in themselves insufficient to produce appreciable anaphylactic reactions in

1. Manwaring, W. H.; Hosepian, V. M.; Porter, D. F., and Enright, J. R.: Hepatic Anaphylatoxin, J. A. M. A. 83:1504 (May 10) 1924.
2. Manwaring, W. H.; Enright, J. R.; Porter, Dorothy F., and H. Bing Moy: The Hepatic Internal Secretion; Further Evidence of Its Role in Canine Anaphylaxis, J. A. M. A. 83:1494 (Nov. 8) 1924.

normal canine tissues. If a normal dog is exsanguinated as completely as possible and transfused from an anaphylactic donor, the dog will usually show no recordable anaphylactic reactions on immediate intravenous injection with specific foreign protein. This negative finding is in line with the well known latent period in passive anaphylaxis.

To make the anaphylactic liver transplantation, the carotid artery of a normal dog was connected by means of a paraffined rubber tube with the portal vein of a sensitized dog. The abdominal vena cava immediately below the sensitized liver was connected with the jugular vein of the normal dog. The remaining blood vessels of the sensitized liver were ligated.

On opening the clamps, throwing the collapsed sensitized liver into the general circulation of the normal dog, we usually recorded a fall in arterial blood pressure of about 15 mm. of mercury. This we attribute solely to expansion of the collapsed sensitized liver.

On now injecting specific foreign protein intravenously into the normal dog, we observed typical anaphylactic reactions. The arterial blood pressure falls within ninety seconds to about a quarter of the normal arterial pressure. The urinary bladder and gastro-intestinal tract are thrown into typical anaphylactic contractions. The blood becomes noncoagulable.

BLOOD TRANSFUSIONS

If blood is drawn from the carotid artery of an anaphylactic dog from two to five minutes after the dog has been thrown into anaphylactic shock, and this blood is immediately transfused into a partially exsanguinated normal dog, no recordable anaphylactic phenomena are usually produced. This finding is in line with the negative results previously reported by Weil.[3] The hepatic anaphylatoxin, therefore, is apparently not present in the general circulation, in appreciable amounts, from the second to fifth minute of anaphylactic shock.

If the foreign protein, however, is injected directly into a mesenteric vein of a sensitized dog and shock blood is collected as it escapes from the liver, this blood, transfused into a partially exsanguinated normal dog, will produce all the characteristic reactions of canine anaphylaxis. One hundred cubic centimeters of this hepatic blood transfused into a 10 kg. normal dog will cause a typical fall in arterial blood pressure lasting thirty minutes, typical contractions of the urinary bladder and of the gastro-intestinal tract, and a typical loss of blood coagulability.

CONCLUSIONS

We believe these experiments furnish conclusive evidence that the dominant initial factor in canine anaphylaxis is the explosive formation or liberation of toxic elements by the liver. These toxic substances are responsible for the loss of blood coagulability and the characteristic contractions of smooth muscles. They are a contributory factor, possibly the dominant factor, in the characteristic fall in arterial blood pressure.

The anaphylactic reactions in normal dogs after anaphylactic liver transplantation, however, are never as severe as reactions in control intact anaphylactic dogs. Recovery is usually complete within thirty minutes. The hepatic anaphylatoxin, therefore, is apparently not the only factor operative in canine anaphylaxis.

3. Weil, Richard: Anaphylaxis in Dogs, A Study of the Liver in Shock and Peptone Poisoning, J. Immunol. 2: 525 (Oct.) 1917.

SUMMARY

All the characteristic reactions of canine anaphylaxis can be produced in a normal dog, by transplanting an anaphylactic liver into its general circulation.

Shock blood drawn directly from the liver of an anaphylactic dog and immediately transfused into a normal dog will produce all the characteristic phenomena of canine anaphylaxis.

Shock blood drawn from the carotid artery of an anaphylactic dog is usually nontoxic.

Clinical Notes, Suggestions, and New Instruments

MODIFICATION OF WILSON'S STAIN*

LOUIS J. SVEHLA, BALTIMORE

Wilson's stain possesses a distinct advantage over the other Romanowsky stains because of its capacity to bring out the character of the red blood cells; for this reason, it is in general use in this country. The preparation, though apparently simple, requires considerable manipulation to obtain and preserve the proper balance of the eosin and methylene blue, and even in the hands of an experienced person a uniform product does not always result. On account of this lack of uniformity and the difficulty in preparation, effort was made to stabilize the product by the addition of buffer salts. After some casting about, the following method was found to be satisfactory and has been used in the Clinical Laboratory of the Johns Hopkins Hospital since 1921.

Methylene blue, 11 gm., dry silver oxid, 7 gm., sodium bicarbonate, 6 gm. and distilled water, 800 c.c., are boiled for sixty minutes, and distilled water is added to the original volume. After the mixture has been allowed to cool and settle, the supernatant liquid is decanted, the precipitate being carefully avoided, into 800 c.c. of distilled water containing 5 gm. of water-soluble eosin. This is mixed by pouring from one beaker to another several times and filtered through hardened paper; the precipitate is washed with distilled water and allowed to dry at 37 C. The precipitate is then ground in a mortar and stored in a dark bottle.

To prepare the stain one should dissolve 0.3 gm. of the pulverized precipitate in 100 c.c. of chemically pure methyl alcohol and add 0.2 gm. of a phosphate mixture, prepared by grinding together in a mortar 6.25 gm. of anhydrous sodium phosphate (Na_2HPO_4) and 4 gm. of anhydrous potassium dihydrogen phosphate (KH_2PO_4). The alcoholic solution is now thoroughly shaken for a few minutes, and 6 drops of a 2 per cent. solution of potassium hydroxid in methyl alcohol is slowly added while shaking. The mixture is allowed to stand for forty-eight hours, and 20 c.c. of chemically pure methyl alcohol is added as a clearing agent; and, after setting twenty-four hours longer, the stain is passed through filter paper and tested against normal red blood cells in the following manner: A dry blood film is covered with the stain for one minute and an equal amount of freshly distilled water is added and allowed to stand for five minutes. It is then washed with distilled water, dried and mounted.

If the erythrocytes have a distinct pink color with no buff and the nuclei of the white corpuscles are light blue, more of the alcoholic 2 per cent. solution of potassium hydroxid should be added, and the stain allowed to stand for twenty-four hours before retesting. If the erythrocytes appear slaty or grayish, and the nuclei in the white corpuscles are stained dark blue, one should add 1 to 2 drops of a 2 per cent. solution of glacial acetic acid in methyl alcohol and allow to stand for twenty-four hours. The stain is now tested to bring out basophilic stippling Cabot ring bodies.

Acetone up to 1 per cent. does not interfere with the staining qualities.

* From the Clinical Laboratory of the Biological Division, Medical Clinic, the Johns Hopkins Hospital and Medical School.

Special Articles

REPORT OF THE COMMITTEE ON THE PROBLEMS OF THE HARD OF HEARING, SECTION ON LARYNGOLOGY, OTOLOGY AND RHINOLOGY *

At the 1923 meeting of the section, the chairman appointed a committee to investigate the problems of the hard of hearing. The data that were collected this year should prove exceedingly interesting, and are the beginning of work along this line that should be of inestimable value in the future.

A great deal has been done during the year by the American Federation of Organizations for the Hard of Hearing, which not only attempts to improve the conditions of the adult hard of hearing but also is working on the problems of prevention of deafness. This organization now has more than twenty affiliated bodies all over the United States, and held its annual meeting in Washington, D. C., early this month, which was attended by more than 300 delegates, all of whom are deaf, who came from all parts of the United States.

In October, 1923, a committee similar to ours was appointed by the Academy of Ophthalmology and Otolaryngology, of which Dr. Horace Newhart of Minneapolis is chairman. It is our purpose to cooperate with this committee.

It has been impossible for the committee to meet during the year, but I have corresponded with the members of the committee, and all of us feel that it is necessary to acquaint the otologists with the necessity of working on the problems of prevention of deafness and also to acquaint them with the various leagues for the hard of hearing and to get them to cooperate with the organizations in their home towns.

Early in the spring, the chairman sent out a questionnaire to a thousand members of the section, which many of you have seen. Thus far he has received 150 answers to the questions, and hopes that before long he will receive many hundred more. The consolidated data should prove most interesting. It has been impossible to analyze all the answers, but for the purpose of this report, I should like to comment briefly on some of the answers.

1. The majority of the profession claim that about 2 to 25 per cent. of their cases are cases of deafness.

2. The majority of the men do not believe that deafness is on the increase; in fact, they feel that it is decreasing because of better attention to nose and throat conditions in children.

3. Most of the men do not believe that heredity plays any part in the causation of deafness except in deaf mutism and when syphilitic taint is present.

4. The most important etiologic factors, according to the majority, are nose and throat conditions that directly affect the eustachian tube.

5. Most of the men feel that otosclerosis is comparatively rare, and assert that they have seen few cases of true otosclerosis.

6. Nerve deafness seems to be a rarity except in syphilis and meningitis.

7. Few of the men have any new form of treatment to recommend.

8. It is the decided opinion that roentgen-ray treatment is absolutely of no value, except so far as it affects the lymphatic tissue in the nasopharynx.

9. Most of the men report that they have seen no beneficial results from any form of mechanotherapeutics or electrotherapeutics, although some state that some forms of vibration are of temporary value.

10. When patients are hopelessly deaf, the majority of the men advise that they save their money, keep away from quacks, and learn lip-reading.

11. I regret to say that the majority of the men do not seem to be working on the psychologic problem of the deaf patient, but wish to know more about it.

12. A great many of the men know of the work of the American Federation of Organizations for the Hard of Hearing, but it is our purpose to acquaint all of them with it.

13. Almost invariably they recommend the wearing of hearing devices, particularly of those adapted to individual cases.

14. Almost all the men approve of the founding of a fellowship for the study of problems of the deaf.

I have purposely made this report brief, but I hope that in another year our data will be sufficient to suggest new methods of procedure.

HAROLD HAYS, Chairman.
HORACE NEWHART.
NORVAL PIERCE.
WENDELL PHILLIPS.
GEORGE SHAMBAUGH.

* Read before the Section on Laryngology, Otology and Rhinology at the Seventy-Fifth Annual Session of the American Medical Association, Chicago, June, 1924.

REPORT OF THE COMMITTEE ON PHYSICAL STANDARDS FOR DRIVERS OF MOTOR VEHICLES *

The appalling increase in the number of casualties from motor vehicles throughout the United States makes it imperative that everything possible be done to lessen this evil. As physicians, cognizant of the harm that may arise from the operation of such vehicles by those physically unfit for such a dangerous operation, an occupation demanding keenness of sight, acuteness of hearing, normal cerebration, and full power in arms and legs, it behooves that we, as a profession, should direct public attention to the subject, and that we should insist on the passage of laws in each state with a view to restricting the granting of licenses to operate motor vehicles to such persons as may submit themselves to physical tests at the hands of properly qualified medical and surgical practitioners, and have demonstrated their physical fitness.

As the opinions of practitioners regarding such physical ability may vary, it is necessary that a standard be adopted of a minimum amount of efficiency below which it would, in the majority of instances, be unsafe for applicants to operate such vehicles. Your committee has, therefore, given careful consideration to the preparation of such standards and begs to submit the following:

1. Every individual driving a motor vehicle, private, public or commercial, of the self-propelled type (automotive) shall be required to present to the motor licensing board in each state a certificate from a reputable physician (the standard of such medical fitness shall be licensure to practice medicine or surgery) in which the following points are certified:

(*a*) The applicant has no disqualifying defects of either legs or arms (anatomic or functional loss of hand, arm, foot or leg).

(*b*) The applicant has vision of at least 20/50 in one eye and vision of at least 20/100 in the other eye, with or without glasses.

(*c*) Double vision shall disqualify.

(*d*) All candidates must be able to hear a low spoken voice at 5 feet.

(*e*) The mentality of the applicant must be adequate and the heart's action reasonably healthy.

Such certificates shall be made on a regular form furnished by the motor board, and, on licensing of the applicant by the board, the applicant shall be furnished with a driving certificate in form of a metal pocketpiece that shall at all times be available for inspection.

Examiners shall be recompensed by a fee paid by each applicant, the amount of such fee being determined by the motor boards in each state.

The license must be renewed every year, but the medical certificate must be made anew every three years, provided

* Read before the Section on Ophthalmology at the Seventy-Fifth Annual Session of the American Medical Association, Chicago, June, 1924.

the applicant makes a sworn statement each intervening year that, to the best of his or her knowledge, there has been no change in his or her physical condition, so far as the certificate applies, since the time of the last examination.

Desirable as it may be that the ocular tests should be made by ophthalmologists, those of hearing by aurists, and those of other parts of the body by internists and surgeons, such specialization is impossible on account of the vast number of tests to be made, and the desirability of making them as simple and the least taxing for applicant and examiner, and with the smallest expense to the former, as possible.

With the aid of the instructions given at the end of this report, general practitioners should have no difficulty in making the visual and aural tests. It goes without saying that each examiner must consider himself bound in honor to adhere implicitly to the dictum of the standards, and to permit no deviations therefrom, either from personal inclination or judgment, or from the importunities of candidates and their friends.

SPECIAL OR COUNTY BOARDS OF PHYSICAL LICENSURE

To pass on the fitness of candidates, regarding whose qualifications any individual examiner may be in doubt, the committee would suggest that in each state there shall be a board of physical licensure in each county, or one for several counties, composed of two general practitioners or surgeons, and one ophthalmologist, which shall meet at stated intervals and have final decision in all cases. These boards shall be appointed by the governor and shall be recompensed by a fee paid by the applicants who may appear before them, or be salaried officers directly connected with the department in each state controlling the granting of motor licenses. Any applicant for a license rejected at the examination by an individual examiner shall be privileged to appear before these boards for a final test and ruling.

It will be argued by some that the visual standards are insufficient; that not only is the visual acuity demanded too low, but that no mention is made of color blindness, which should be disqualifying. In answer, your committee would state that it is not the degree of visual acuity that might be desirable for each candidate to possess that must be determined, but the minimum amount of sight with which it is possible to drive a motor vehicle with safety. The degree of vision incorporated in the standards is much the same as the army demands of its soldiers; a higher degree or standard would debar very many who are now operating cars with safety. Field defects, being usually dependent on intra-ocular diseases and associated with lowered central visual acuity, demand no special tests for their detection, the lowered central acuity disqualifying. It is the opinion of the committee that the few candidates with field defects of central origin, with unimpaired visual acuity, who might apply for examination, would, in most instances, be disqualified by other and more apparent signs of physical disability.

In any event, the insistence of a visual field test, as part of every examination for licensure, seems unnecessary and undesirable, especially as it is doubtful whether general pratitioners and surgeons can be depended on to make such tests with sufficient accuracy.

The insistence on normal color perception would disbar 3 per cent. of all males applying for license and would doubtless lead to the popular and speedy rejection of all physical tests. Moreover, though the color blind driver might be able to recognize a tail light as red, per se, he would be conscious of its difference in intensity from a white light and would give heed thereto.

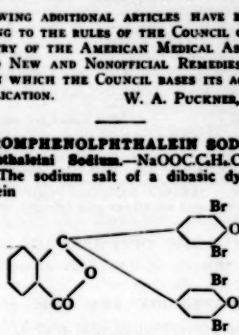
To assure the universal adoption of any kind of a physical test, it would, in the opinion of the committee, be a mistake to demand too much of either applicant or examiner. For that reason, simplicity and an avoidance of unessentials must be insisted on. In doubtful and disputed cases, examiners and applicants have the county boards of physical licensure to resort to for consultation and ultimate decision.

CONRAD BERENS, JR.,
WILLIAM C. FINNOFF,
HARRY S. GRADLE,
WILLIAM CAMPBELL POSEY, Chairman.

New and Nonofficial Remedies

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION. W. A. PUCKNER, SECRETARY.

TETRABROMPHENOLPHTHALEIN SODIUM.—Tetrabromphenolphthaleini Sodium.—$NaOOC.C_6H_4.C:C_6H_2Br_2O.C_6H_2Br_2ONa$.—The sodium salt of a dibasic dye, tetrabromphenolphthalein



which differs from phenolphthalein in that four hydrogen atoms have been replaced by four bromine atoms. The sodium salt contains about 47 per cent. of bromine.

Actions and Uses.—Tetrabromphenolphthalein sodium is used for the roentgenologic examination of the gallbladder. Following intravenous injection, the substance appears in the gallbladder in sufficient concentration to cast shadows to the roentgen ray. After injection some of the patients may have unpleasant sensations such as dizziness, nausea, various body pains and fall in blood pressure; the transitory fall in blood pressure may be relieved by administration of 0.5 to 1 Cc. of epinephrine (1 to 1,000) intramuscularly. The use of tetrabromphenolphthalein sodium is still in the experimental stage and workers are cautioned as to the selection of types of cases in which it is indicated and its possible toxicity in large doses.

Dosage.—A dose of 0.1 Gm. per Kg. has been found sufficient to cast a shadow. To visualize the gallbladder in the patient, 4.5 to 5 Gm. of tetrabromphenolphthalein sodium (which has not undergone change by exposure to light) are dissolved in 35 to 40 Cc. of freshly distilled water and filtered. The solution is then sterilized by heating the container in boiling water for 20 minutes. This dose is sufficient for a person weighing 125 pounds or more and should be reduced for patients weighing less. The solution is given intravenously with a syringe in two doses, one-half hour apart, in the morning before breakfast. Care should be taken not to allow extravasation on account of tissue necrosis.

Tetrabromphenolphthalein sodium is a purple powder, odorless. It is very soluble in water; its aqueous solution has a reaction of $p_H = 8$ to 10. It is very slightly soluble in alcohol, insoluble in ether.

Dissolve 1 Gm. of tetrabromphenolphthalein sodium in 4 Cc. of water; a clear solution results.

Add diluted hydrochloric acid, drop by drop, to 1 Cc. of tetrabromphenolphthalein sodium solution (1 to 10) until acid; a white precipitate results. Add sodium hydroxide solution in great excess; the precipitate dissolves, the purple color first forms, then disappears.

To 1 Cc. of an acid solution of tetrabromphenolphthalein add 2 Cc. of bromine water; a yellow precipitate results.

Weigh accurately 0.25 Gm. of the sample and place in a 300 Cc. Kjeldahl flask; add exactly 17 Cc. of absolute alcohol and connect the flask with a reflux Liebig condenser, cooled with tap water. Warm slightly and begin the introduction of sodium metal. The sodium metal is prepared by rolling 2.3 Gm. of the metal free from surface film between filter paper into small (10-15 pieces) rods. This should be kept in a tightly stoppered weighing bottle during the operation. The sodium is then added through the top of the condenser, one piece at a time. After several pieces have been added, there may be two or three undissolved pieces in the flask at one time. The addition of the sodium should take between 30 and 40 minutes. The solution of the last half of the sodium may require very gentle heating (*caution*). After the sodium is all added, reflux the mixture gently for one hour and then allow to cool. Add water, 1 Cc. at a time through the top of the condenser until any sodium is taken up. The flask may then be disconnected and more water added and shaken until the precipitate is completely dissolved. Transfer to a 500 Cc. Erlenmeyer flask and dilute to 200 Cc.; acidify with 20 per cent. nitric acid solution and add 25 Cc. of tenth-normal silver nitrate and 2 Cc. ferric nitrate indicator solution. Titrate the unconsumed silver nitrate with tenth-normal ammonium sulphocyanate solution. The amount of bromine should not be less than 43.5 per cent.

MERCUROCHROME-220 SOLUBLE (See New and Nonofficial Remedies, 1924, p. 205).

The following dosage form has been accepted:

Sealed Tubes Mercurochrome-220 Soluble, 0.5 Gm.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, DECEMBER 27, 1924

HYPERTENSION AND URIC ACID

The routine estimation of uric acid in the blood, a procedure made feasible a decade ago by the development of relatively simple colorimetric methods of analysis of small samples of the circulating fluid, has already furnished sufficient statistics to justify certain deductions regarding the end-product of purin metabolism in man. It is obvious that in the days of Garrod's classic tests of the blood for uric acid, wherein he used several hundred cubic centimeters of the fluid for each determination, the accumulation of analytic facts was necessarily very slow in contrast with the present-day use of less than a spoonful of blood. Early in the history of the application of the modern colorimetric technic, the impression was gained that the retention and accumulation of the uric acid precedes and exceeds that of the nonprotein nitrogen in the early stages of kidney insufficiency. Thus, it was reported that the first of the nitrogenous substances to be retained is uric acid; then follows urea; and only when the impairment of the kidney activity becomes very marked does creatinin accumulate in the blood. Uric acid retention was accordingly made an evidence of nephritis and an early index of renal function. Folin,[1] however, has attacked the assertion that uric acid retention represents any special difficulty in the process of excretion. Later, Feinblatt[2] reported a study of 1,500 persons with routine blood chemical analyses showing that the great majority of patients with high blood concentration of uric acid but not of urea nitrogen or creatinin exhibited no evidence at all of early chronic interstitial nephritis. Feinblatt has insisted that the blood uric acid reading is of no value unless correlated with that of urea nitrogen (or total nonprotein nitrogen). A high concentration may be interpreted as a symptom, along with the other manifestations, but is in no sense diagnostic in itself of early chronic interstitial nephritis or any other condition. A similar conclusion has been reached by Fishberg[3] from a study of more than a hundred cases of chronic hypertension. Uricacidemia was a characteristic of many of them that showed normal amounts of urea in the blood; yet there was no discoverable tendency to subsequent retention of urea and the parallel development of uremia. The cases were usually "benign" so far as the kidney was concerned, and no prognostic significance could be assigned to the estimations of uric acid in the blood. Feinblatt was unable to discern any differences in the symptomatology and course of the cases presenting hyperuricemia and those presenting a normal blood uric acid. Hence, he concludes, like the hyperglycemia so common in hypertension, the increased uric acid content of the blood is due to metabolic causes and not to beginning renal insufficiency. When renal insufficiency sets in, the uric acid level of the blood rises, but it is then accompanied by a rise in the blood urea, which differentiates the hyperuricemia of renal origin from that accompanying hypertension in the presence of intact kidney function. For the present, analytic evidences of uricadicemia should still be interpreted with cautious conservatism.

1. Folin, Otto: Non-Protein Nitrogen of Blood in Health and Disease, Physiol. Rev. 2: 460 (July) 1922.
2. Feinblatt, H. M.: Uricacidemia: Based on a Study of One Thousand, Five Hundred Blood Chemical Analyses, Arch. Int. Med. 31: 758 (May) 1923.

THE PRODUCTION OF ANTISCORBUTIC VITAMIN BY GERMINATION

In discussing what he fancifully terms "the importance of 'little things' in nutrition," Professor Mendel[4] recently recalled the reminder of a writer more than three fourths of a century ago who remarked that "lemon juice, which constitutes one of our most valuable antiscorbutic foods, does not owe its efficiency to water, sugar, albumin or oil." Long after those words were uttered calling attention indirectly to the existence of potent dietary ingredients not described in terms of the familiar foodstuffs, the antiscorbutic potency of such food products was given another name: vitamin C. The name is useful, though it does not afford a clear indication of precisely what is involved in the prevention or cure of scurvy. The intensive investigation of the vitamins during the last decade has afforded a wealth of illustration regarding the unanticipated distribution of these food factors and the alterations to which this becomes subject through modern methods of manipulation and manufacture. Changing chemical and physical procedures for conservation and desiccation of edible products, and altered methods of milling grains and refining animal and vegetable materials suitable for human consumption, are responsible for variations in the vitamin content of numerous components of the dietary. The raw milk, whole wheat, crude fats and fresh vegetables of one or two generations ago have to a large extent become pasteurized or evaporated milks,

3. Fishberg, A. M.: The Interpretation of Increased Blood Uric Acid in Hypertension, Arch. Int. Med. 34: 503 (Oct.) 1924.
4. Mendel, L. B.: Nutrition: The Chemistry of Life, Yale University Press, 1923.

patent flour, refined or hydrogenated oils and canned foods in this day.

Most of the changes represented involve features that have something to recommend them. We are not so reactionary as to assert that the old is always better than the new and that innovations in food manufacture have no redeeming aspects. In respect to antiscorbutic properties, however, it must be frankly admitted that the changes have as a rule been attended with a decrease of vitamin C. This has proceeded to such an extent that intelligent dietitians are alert to the need of supplying antiscorbutics, notably in the form of fresh fruits or fruit juices and fresh vegetables. It is not generally realized that man has it within his power to produce antiscorbutic vitamin readily by the simple device of germinating certain seeds. Cereals and legumes lend themselves to such manipulation. It is as a preventive of scurvy that the inclusion of germinated products in a diet deficient in fresh fruit and vegetables is principally to be recommended. In many parts of the world there exists the practice of eating certain seeds in the germinated condition, although there is no suggestion that the antiscorbutic value of such foods has been appreciated. According to Chick and Delf,[5] in the Dutch Indies and Federated Malay States germinated beans, or "tow-gay," are eaten raw as a common article of diet. In certain districts of China it is the custom to take part of the rice in the germinated condition and, especially in the North, beans are artificially sprouted for food in the winter.

We are told also that there is little doubt that the antiscorbutic value of certain fermented beverages, firmly believed in by our ancestors, was attributable to the germinated grains from which they were prepared. Captain Cook was a believer in the antiscorbutic properties of a fresh infusion of malt, "sweetwort." He always took large quantities of malt to sea with him, and the sweetwort was served out to his men in large quantities when there was any risk of scurvy. "Small beer" also enjoyed a great reputation, and in many arctic expeditions in the first half of the nineteenth century, malt, yeast and a brewing plant were included in the equipment. Modern beers prepared from heated malt have lacked appreciable antiscorbutic value.

At the University of Wisconsin, Honeywell and Steenbock[6] have demonstrated anew that vitamin C is synthesized in considerable amounts by the barley kernel during germination. This takes place even in the dark. It does not, however, take place to any appreciable degree when carried out in the absence of oxygen. From this it appears that vitamin C, though easily destroyed by oxygen, nevertheless requires oxygen for its synthesis by the germinating seed. Under normal conditions of living it is not necessary to resort to such vitamin-producing devices. However, the exigencies of the late war, with its incidence of deficiency diseases, including scurvy, are still fresh enough in our memory to give a real value to the knowledge of how antiscorbutics can be created in times of stress. Serbian soldiers were protected against scurvy by germinated beans, and Kaffir labor battalions in France found nutritive safety in germinated millet, despite their limited diet. Thus the magic of heat, moisture and oxygen converts even much despised seeds into a wealth of human protective provender.

5. Chick, H., and Delf, E. M.: The Antiscorbutic Value of Dry and Germinated Seeds, Biochem. J., 13: 199 (July) 1919.
6. Honeywell, E. M., and Steenbock, H.: The Synthesis of Vitamin C by Germination, Am. J. Physiol. 70: 322 (Oct.) 1924.

EFFECTS OF MICROBIC INFECTION ON METABOLISM

Almost nothing is known as to the direct effects of microbic infection on metabolism. Probably definite alterations in metabolism are brought about by the interaction of tissue enzyme with enzymes, coenzymes and antienzymes of microbic origin, and possibly by the presence of microbic vitamins. Microbic infection may, however, bring about metabolic changes indirectly that are of importance in understanding disease conditions. Qualitative or quantitative alterations in food intake, alterations of oxygen supply, local destructive processes, and changes in functional activity and in excretion and carbon dioxid elimination are some of the metabolic disturbances that may follow infection.

Microbic infection may reduce food intake, for example, by anorexia, pain, muscular inability or lack of nervous control, by vomiting, diarrhea, or diminished power of digestive fluids, the resulting metabolic changes approximating those of inanition. There is a rapid and ultimately an almost complete consumption of the body fats and carbohydrates, followed by a rapid consumption of the body proteins. The respiratory coefficient decreases from 0.85, its value on an ordinary mixed diet, to approximately 0.7, its value on a pure protein diet. The nitrogen of the urine rapidly drops to a minimum, which represents the smallest protein destruction compatible with life, and remains at this low level as long as the body is living on its stored-up fats and carbohydrates. As soon as the body begins to draw on its protein as its main source of energy, there is a rapid increase in the urinary nitrogen. Since practically all the sodium chlorid of the food usually appears promptly in the urine, on withdrawal of food the sodium chlorid excretion rapidly decreases to a small amount, representing only that set free by tissue destruction. The food usually contains an excess of sodium, while the tissues contain an excess of potassium salts. On the withdrawal of food, therefore, the potassium-sodium ratio in the urine changes from 2 to 3, the ratio on an ordinary mixed diet, to approximately 3 to 1, the ratio of the salts in the living tissues. Equally important alterations in food intake probably result from altered permeability of the gastro-intestinal tract. Increased permeability allows absorption of many

substances normally excluded from the tissues. Probably the most important of these are undigested or partially digested foreign proteins. Foreign proteins find inadequate provision for their destruction or elimination in normal tissues, and set up immunologic processes, the most important of which clinically is probably the development of specific hypersensitiveness, with the resulting metabolic changes of anaphylaxis.

Probably the best understood alteration in food intake results from fermentative and putrefactive processes in the gastro-intestinal tract. The lowered acidity of the gastric juice, the atony and lessened peristalsis that accompany certain infections, favor the growth of yeasts and bacteria. Fortunately, many of the resulting products so irritate the mucosa that vomiting and diarrhea take place. Absorption, however, is usually sufficient to bring about important changes in the body fluids. A few of the products, such as cholin and neurin, are extremely toxic. Most of the products, however, have but slight toxicity and are readily disposed of by the tissues. Such substances as cadaverin and putrescin are excreted unchanged. Most of the acids unite with alkalis of the body fluids to form salts, which may appear unchanged in the urine. Such substances as phenol, cresol and certain aromatic oxyacids unite directly with potassium bisulphate, glycocoll and glycuronic acid to form nontoxic conjugation products, which are excreted in the urine unchanged. Others, such as indol and skatol, are first partially oxidized and then form conjugation products. Still others, as tyrosin, are completely oxidized in the tissues. Some of these products are readily detected in the urine and are of diagnostic importance.

Metabolic processes may also be altered by reduced oxygen supply. This may be brought about by such factors as narrowing of the respiratory passages, reduced respiratory movements, reduced alveolar surface, and reduced oxygen-carrying capacity of the blood. The exact nature of the resulting metabolic changes are poorly understood; but there is usually an increase in the urine of oxalic acid, lactic acid, ammonium salts, xanthin bases, and other products of incomplete oxidation.

Pathogenic micro-organisms, either alone or in association with nonpathogenic forms, may set up destructive changes in local tissues. These are illustrated by the disintegration of erythrocytes in malarial fever, the necrosis and liquefaction of abscesses, and the putrefaction of gangrene. The agents bringing about these changes are: the toxins and enzymes of the invading micro-organisms, the enzymes of leukocytes and red blood corpuscles, and the autolytic enzymes of fixed tissues. The resulting products vary from the simple albumoses and peptones of autolysis to end-products similar to those of intestinal putrefaction. Certain of these substances, such as hemoglobin, histon, Bence-Jones protein and certain diazobodies may appear in the urine and are of diagnostic importance.

Apart from destructive changes, microbic infection may bring about important alterations by stimulating or depressing the metabolic activity of tissues. This may be due either to a direct action of the infectious agents or their products on the tissues, or indirectly to nervous, circulatory and respiratory changes, or to disturbed hormone activity. Increased metabolism manifests itself by increased heat production and by the appearance in the urine of increased amounts of metabolic end-products. Nitrogenous excretion, for example, may be increased by this means two or three times that of normal. It is probable also that there are important alterations in the delicate protein molecules due to changes in temperature alone. Very important metabolic alterations probably result also from microbic denaturization of tissue proteins. Denaturized proteins may set up immunologic processes in the body, with the possible development of specific hypersensitiveness.

Infections may also bring about important metabolic changes by causing abnormal losses or retentions. Such losses may be illustrated by albuminuria, diarrhea and hemoptysis, the discharge of inflammatory exudates, and the sloughing of necrotic tissues; the retentions by anuria, catarrhal jaundice and reduced carbon dioxid elimination. The resulting metabolic changes are mainly quantitative; but important qualitative changes may follow secondarily.

The wide variety of effects on the human body brought about by infection are therefore especially significant in the light of the challenges sometimes issued against what the proponents of various fads and cults erroneously call the "germ theory." Such measurable phenomena as are here recorded are in no sense of the word theoretical. They are unfortunately only too often serious and even fatal realities.

Current Comment

THE ALIMENTATION OF ATROPHIC INFANTS

The problem of the management of atrophic infants suffering with the condition ordinarily described as marasmus is one that confronts every pediatrician. Whenever the body weight is decidedly below normal, the procedure for inducing restoration of growth at a satisfactory rate must depend, to some extent at least, on the clinician's theory as to the causation of the disorder. Some of the European workers in particular have stressed the occurrence of digestive disturbances that prevent the proper utilization of fats. Through the consequent formation of unabsorbed fatty acids, alkalis and alkali earths are excreted into the intestine or retained in the bowel and thus lost through the feces. On this hypothesis, "demineralization" of the organism is an important factor in the production of the symptoms, and dieting becomes difficult because

of the danger that an unfitting food mixture will only aggravate the serious situation through further induced alimentary losses. Partial starvation is often recommended, followed by relatively fat-free mixtures. Obviously, gains cannot be made very rapidly on such a regimen. American pediatricians have of late not followed this school. Holt,[1] for example, was skeptical as to the alleged effects of low assimilative power for fat. Marriott[2] of St. Louis believes that atrophy is an expression of partial starvation for long periods of time. Parsons[3] of the Children's Hospital in Birmingham, England, has observed that fat absorption in infantile atrophy in the absence of diarrhea may be quite normal; and in the same clinic Hickmans[4] has completed the demonstration that many atrophic infants can absorb calcium as well as normal infants can. In some cases the defectives do this even better. Various investigators thus contend that in atrophy an ample intake of fat and calcium is actually beneficial. This appears to be a more encouraging outlook, since food is the very basis of growth.

THE STATISTICS OF DIABETES

During the long history of diabetes there has probably been no period during which it was subjected to the intensive study that has been accorded it since the discovery of insulin. Clinicians have long recognized the extent of the menace that diabetes represents. It is not merely the death of a small army of persons each year from diabetes that makes the situation formidable; the disorder incapacitates a further great army of otherwise normal persons. Consequently it becomes a public duty to awaken the nation and also the medical profession, if need of this becomes apparent, to the seriousness of a situation that has recently been emphasized vigorously anew by competent statisticians.[5] Mortality data compiled by Emerson and Larimore of New York make clear that a consistent and great actual increase in the diabetes death rate has occurred in New York City between 1866 and 1923, and similarly in many other population groups in recent years. There has been a considerable shift in relative importance, numerically, of the leading causes of death, which has dropped tuberculosis from first to fourth place and has brought diabetes up to tenth place. While, in New York City, one death from diabetes was recorded in 1866 for each 2,437 deaths from all causes, in the year 1923, one death from diabetes was recorded for each fifty-one deaths from all causes. In the registration area of the United States in the last forty years there has been a change from 2.8 to 16.1 in the death rate from diabetes per hundred thousand of population, while the death rate from all causes has fallen steadily during this period. The facts are clear and disconcerting, for the cause of the growing incidence of this metabolic disorder is not apparent. To point to the higher mortality from diabetes among certain racial groups implies an hereditary or biologic factor that cannot be substantiated; for, as Emerson points out, many elements of occupation, economic status and dietetic habits may be found sufficient to explain the range of experience with what may fairly be considered, in the great majority of cases, a disease of a fatigued function. Perhaps, as has been alleged, the changes in food habits in the United States have contributed to the increase of diabetes, the higher carbohydrate element and greater abundance or superalimentation being believed to be a cause of overfatiguing the function of sugar tolerance. The imputation has been vigorously attacked. It happens, fortunately for persons with diabetes as well as for victims of various other maladies, that early recognition brings greater possibilities of relief, even if prevention cannot be secured. The awakening of the public to such possibilities is therefore worth while. Emerson's dictum also will bear repetition: Moderation in the use of food, and sufficient exercise with the entire body to justify the food absorbed, are important rules of hygiene for other reasons besides that of the relationship between obesity and diabetes; but if there were no other excuse for bringing this ancient teaching to people's attention, the greatly increased frequency of diabetes as a cause of sickness and death would alone seem to justify physicians and all those dealing with health and its protection in initiating and pushing vigorously a campaign of information in this subject.

1. Holt, L. E.; Courtney, A. M., and Fales, H. L.: Calcium Metabolism of Infants and Young Children, Am. J. Dis. Child. 19:97 (Feb.) 1920.
2. Marriott, W. M.: Some Phases of Pathology of Nutrition in Infancy, Am. J. Dis. Child. 20:461 (Dec.) 1920.
3. Parsons, L. G.: Lancet 1:687 (April 5); 729 (April 12), 1924.
4. Hickmans, E. M.: The Calcium Metabolism of Atrophic Infants and Its Relation to Their Fat Metabolism, Biochem. J. 18:924, 1924.
5. Emerson, H., and Larimore, L. D.: Diabetes Mellitus, a Contribution to Its Epidemiology Based Chiefly on Mortality Statistics, Arch. Int. Med. 34:585 (Nov.) 1924.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

CALIFORNIA

Medical Service and the Legislature.—There is a movement on foot to try to have the next California legislature declare health and medical service to be a public utility and thus place its supervision under control of the state.

Resolution on Radio Broadcasting.—The council of the California Medical Association at Long Beach, November 8, adopted the following resolution:

WHEREAS, Medical radio broadcasting, because of the great distances covered, is fraught with grave dangers to many lay listeners because of subject matter not applicable to local conditions; and,

WHEREAS, To keep medical radio broadcasting impersonal and in conformity with the ethics of the American Medical Association is almost impossible; and,

WHEREAS, Human nature is such that medical radio broadcasting is almost certain to be abused by certain medical men; now, therefore, be it

Resolved, That the Council of the California Medical Association hold: First, that no radio bureaus established for medical broadcasting be inaugurated or participated in by members of the California Medical Association except under permission of and with the observance of such rules as the "Medical Radio Broadcasting Committee of the California Medical Association" may promulgate in regard thereto. Second, that no question and answer service department be conducted as a part of any medical radio broadcasting service, and, third, that a copy of this resolution be sent to the American Medical Association and every county medical society, and the attention of such organizations called to the dangers incident to medical radio broadcasting.

DISTRICT OF COLUMBIA

Society News.—At the annual election, December 3, the Medical Society of the District of Columbia elected Dr. Thomas A. Groover, president; Drs. Oscar B. Hunter and John A. Foote, vice presidents, and Dr. Coursen B. Conklin, secretary-treasurer for 1925.

Testimonial Luncheon to Dr. Eliot.—On the completion of fifty years of practice in Washington, D. C., friends of Dr. John Llewellin Eliot tendered him a luncheon, December 16, at which Dr. John D. Thomas, president of the Medical Society of the District of Columbia, reviewed Dr. Eliot's career as a member of the society, Dr. Samuel S. Adams that of the general practitioner and Dr. William C. Fowler as an expert in the smallpox service of the department of health. Dr. George M. Kober reviewed Dr. Eliot's work as an author who had more than 220 contributions to his credit.

ILLINOIS

Medical Practice Act Upheld.—The state supreme court upheld, December 16, the medical practice act of 1923. The appeal was brought by a naturopath, who was fined $500 and costs in the Chicago Municipal Court.

Society News.—At the regular meeting of the Rock Island County Medical Society, Moline, December 9, Dr. Julius H. Hess, professor of pediatrics, University of Illinois School of Medicine, Chicago, gave an address on "Some Chronic Abdominal Conditions in Children."

Personal.—Dr. Clarence L. Whitmire has been appointed assistant managing officer of the Jacksonville State Hospital to succeed Dr. Thomas G. McLin, resigned.——Dr. Lydia H. Holmes, Pekin, has been appointed superintendent of the Fairview Sanatorium, Bloomington.——Dr. Henry W. Sandeen, Woodstock, has been appointed county physician of McHenry County.

Chicago

Hospital Transfer Legal.—The U. S. Supreme Court affirmed, December 15, the decision of lower courts in upholding the legality of the transfer of the Speedway Hospital to the federal government. Thus ends a long suit brought by certain minority stockholders in the original enterprise.

Institute of Medicine Elects.—The board of governors of the Institute of Medicine announce the following elections for the coming year: Drs. James B. Herrick, president; Charles A. Elliott, vice president; George H. Coleman, secretary; Dallas B. Phemister, treasurer, and Ludvig Hektoen, chairman of the board of governors.

Personal.—Prof. Julius Stieglitz, Ph.D., chairman of the department of chemistry, addressed the one hundred and thirty-fifth convocation of the University of Chicago, December 23, on "Chemistry in the Service of Man." One hundred and eighty-eight degrees were conferred, Rush Medical College conferring seventeen four-year certificates and thirteen M.D.'s.

Meeting on Prevention of Juvenile Delinquency.—In commemoration of the twenty-fifth anniversary of the founding of the first juvenile court, and the fifteenth anniversary of the establishment of the first institute for juvenile research, meetings will be held at the City Club, Chicago, January 2-4, devoted to the problems of juvenile care. At the morning session of the first day, Miss Jane Addams will preside, and speakers will include, in addition to city officials: Miss Julia C. Lathrop; Judge Ben Lindsay; Miss Grace Abbott of the Children's Bureau, Washington, D. C., and judges of juvenile courts in Chicago. At the afternoon session, the speakers will include Judge Frederick P. Cabot of the juvenile court, Boston; Judge Henry S. Hulbert, juvenile court, Detroit, and Dr. George W. Kirchway, dean of Columbia Law School and formerly warden of Sing-Sing Prison. The latter discussion will cover the detention, probation and institutional care of children. A banquet will be held on the evening of January 2 at the Congress Hotel, at which the chief addresses will be made by Hon. Julian W. Mack, judge of the United States Circuit Court of Appeals, and Dr. Miriam Van Waters of the juvenile court of Los Angeles. The sessions on January 3 will be devoted to the diagnosis and treatment of delinquency, including papers by the director of the Chicago Charities and by public welfare officials. The afternoon session will concern the preschool period of the child, including papers by Dr. Helen T. Wooley, Detroit; Dr. Marion E. Kenworthy, New York, and Elizabeth Woods of the Wisconsin Department of Public Instruction. A dinner will be held on the evening of January 3 at the City Club, at which Dr. Ludvig Hektoen will preside. Papers will be delivered by Dr. William Healy, "Psychology of Situations in Causation of Delinquency and Crime," and Dr. Herman Adler, "Our Responsibility for the Future." The session on January 4, at 4 p. m., will provide a symposium on the foundations of behavior, including papers by Charles M. Child, professor of zoology of the University of Chicago, "The Individual and Environment from a Physiological Viewpoint"; and C. Judson Herrick, professor of neurology of the University of Chicago, "Self-Control and Social Control." At the evening session, papers will be presented by Franz Boas, professor of anthropology at Columbia University, "Growth and Development, Bodily and Mental, as Determined by Heredity and by Social Environment," and Ernest R. Groves, professor of sociology, University of Boston, "Socializing Human Nature."

INDIANA

Smallpox.—Reports received by the state board of health in Indiana showed that within the past month smallpox prevailed in "mild form" in more than twenty-five counties of the state.

Dr. Biggs Resigns.—Dr. Byron E. Biggs, superintendent of the Indiana State School for Feeble-Minded Youths, Fort Wayne, has resigned, effective January 1. Dr. Biggs will be succeeded by James G. Jackson, a brother of the governor-elect.

Hospital News.—The Charles E. Russell property, Michigan Avenue and Osborn Street, Laporte, has been purchased for the site of the proposed Protestant Hospital.——The Floyd County Tuberculosis Association has raised about $40,000 for a proposed county tuberculosis hospital.

Society Reorganized.—The Shelby County Medical Society, which has been inactive for several years, was reorganized, December 3, at Shelbyville. Dr. Sam Kennedy, Shelbyville, was elected president; Dr. Leslie C. Sammons, vice president, and Dr. Frank E. Bass, secretary-treasurer.

Public Health Nursing.—According to the annual report, department of public health nursing, state board of health, public health nurses made 279,562 visits to homes and schools and health meetings in the year ending September 30, and assisted in 1,074 clinics in the fiscal year. More than 38,000 visits were in the rural districts.

IOWA

Society News.—Dr. Fred M. Smith, professor of medicine, State University of Iowa College of Medicine, Iowa City, addressed the Marshall County Medical Society, December 8, on "The Use of Digitalis in the Treatment of Cardiac Irregularities." Dr. William F. Hamilton was elected president of the society at this meeting.

Hospital News.—Ground has been broken for the construction of a $400,000 building for St. Joseph's Hospital, Ottumwa.——The Deaconess Hospital, Marshalltown, has authorized a $150,000 issue of bonds for a new building to house the physiotherapy, hydrotherapy and electrotherapy departments and to accommodate forty patients.

KENTUCKY

Personal.—Dr. Curran Pope, Louisville, has been appointed by the governor a member of the board of charities and corrections for a term of four years.——Dr. Benjamin F. Johnson has been appointed a member of the board of health of Winchester, and Dr. Edward P. Guerrant, president of the board, whose term expires December 31, has been reappointed.

Home for Crippled Children.—The president of the crippled children's commission announced, December 6, that an old colonial mansion having spacious grounds on the outskirts of Lexington had been donated as a home for crippled children by the Fayette County authorities. It will be used for children who are convalescing after operations designed to correct their deformities. The last legislature appropriated $20,000, it is reported, for the equipment and maintenance of some such hospital.

LOUISIANA

Plague Eradication.—Dr. Charles V. Akin, Jr., U. S. Public Health Service, arrived at New Orleans, December 20, to take charge of plague eradication.——Surg. Gen. Hugh S. Cumming, U. S. Public Health Service, spent, December 15, in New Orleans, en route to California.

Appointment of Superintendents. — The governor has appointed a complete new board for the State Charity Hospital, Shreveport. Dr. John M. Mosely, Arcadia, it is reported, will be appointed superintendent.——It was reported, December 11, that a new board for the East Louisiana Hospital, Jackson, would be appointed, and that Dr. Thomas Joseph Perkins, Red Fish, would be the new superintendent.

Society News.—The president of the Louisiana State Medical Society, Dr. Clarence V. Unsworth, New Orleans, addressed the Fourth District Medical Society at its regular semiannual meeting, Shreveport, November 12.——Dr. Marion

H. Foster, Alexandria, addressed the Physicians' Improvement and Protective Association of the South at Trout, November 6, on "Renal Calculi."——At the last meeting of the Orleans Parish Medical Society, New Orleans, Dr. Maurice J. Gelpi was elected president; Drs. Lionel L. Cazenavette and Jerome E. Landry, vice presidents; Lucien A. Ledoux, secretary, and John A. Lanford, treasurer.

MAINE

Hospital Library Service.—In conjunction with the Eastern Maine General Hospital, the Bangor Public Library has opened a hospital library service. Books are furnished to the hospital by the library, the latter supplying the library room and equipment. An attendant of the public library gives an afternoon a week to the hospital to deliver books and consult with patients as to what books they want.

MARYLAND

Clinic for Chest Diseases.—A clinic to provide instruction to colored physicians, was opened, November 17, at the Provident Hospital, Baltimore. Dr. Sahler M. Greenberg, of the Phipps Tuberculosis Dispensary, will be in charge, with the assistance of six colored physicians, designated by the colored medical society.

Society News.—The Baltimore City Medical Society recently elected Dr. Charles F. Blake, president; Dr. William T. Watson, vice president, and Dr. John T. King, secretary (reelected). Dr. Nolan D. C. Lewis, of the St. Elizabeth's Hospital, Washington, D. C., addressed the society on the present status of the treatment of general paresis.——Dr. Howard F. Root, Boston, gave an illustrated lecture on "Practical Aids in the Modern Treatment of Diabetes," before the Baltimore City Medical Society, December 19.——Dr. Simon Flexner, director, Rockefeller Institute for Medical Research, New York, lectured on "Epidemiology of Intestinal and Respiratory Infections: An Experimental Study," and Dr. Joseph S. Lawrence, director, New York State Department of Health, on "Administrative Control of Venereal Diseases," December 8 and December 15, respectively, at the School of Hygiene and Public Health, Johns Hopkins University, Baltimore.

MASSACHUSETTS

Personal.—Dr. Winfred Overholser, Harding, assistant superintendent of the Medfield State Hospital, has been appointed assistant to the commissioner of mental diseases.——Dr. Frank H. Lahey, professor of surgery, and Dr. Charles D. Knowlton, assistant professor of medicine, Tufts College Medical School, Boston, have resigned.——Dr. Arthur J. Ledoux has resigned as a member of the Fall River Board of Health to accept an appointment as resident physician at the Tuberculosis Hospital and diagnostician to the board of health.

Committee on Standards for Licensing Physicians.—The special committee appointed by the state legislature to pursue investigations started last year in connection with the diploma mill scandal, presented recommendations, December 15. It would aim to raise the standards in Massachusetts to a par with that of other states. The committee said in part, it is reported, that the standards of registration to practice medicine in Massachusetts are lower than in most other states, which refuse to adopt reciprocal relations with Massachusetts. The committee recommended that the policy of not licensing chiropractors and midwives be continued.

MICHIGAN

Hospital News.—Work has started on the construction of the new Wakefield City Hospital which will cost about $75,000, including equipment.——St. Mary's Hospital, Grand Rapids, recently raised $280,000 for a new building.

Beaumont Lectures.—Drs. Charles H. Mayo and William A. Plummer, Rochester, Minn., will deliver the three Beaumont lectures, under the auspices of the Wayne County Medical Society, Detroit, January 26-27, on "Problems of the Thyroid."

Society News.—Dr. Axel Reyn, president of the Danish Radiological Society, and head of the Finsen Light Institute of Copenhagen, addressed the Wayne County Medical Society, Detroit, December 1, on "Light Therapy and Medicine."——Dr. Carl D. Camp, professor of neurology, University of Michigan Medical School, Ann Arbor, addressed the Wayne County Medical Society, December 8, on "The Management of Cases of Psychoneurosis."

Personal.—Dr. James E. Davis, Detroit, addressed the Toledo, Ohio, Academy of Medicine, November 7, on "Problems in the Surgical Pathology of the Kidneys."——Dr. William Westrate, Holland, has been elected by the council a member of the state board of health to fill the vacancy made by the death of the late Dr. Teunis A. Boot.——Dr. Ernest F. Gamble, Coldwater, has been appointed health officer of that city, to succeed Dr. Frederick W. Stewart, resigned.——Dr. Frank S. Bachelder, assistant medical superintendent, Pontiac State Hospital, has resigned after eighteen years' service to enter practice in Pontiac.——Dr. Wellington B. Huntley, Ionia, for three years resident physician at the Michigan Reformatory, has been appointed director of institutional health administration for Michigan.

MINNESOTA

Personal.—Dr. Jesse L. McElroy, who has just resigned as superintendent of the Ancker Hospital, St. Paul, will assume the duties of superintendent, St. Mark's Hospital, New York, January 1.

State Board on Vaccination.—In response to many requests from boards of health in Minnesota, which were uncertain as to their authority to arrange for free vaccination against smallpox before the disease appears in their communities, the state board of health resolved, November 15, that, in its judgment, Regulation 1302, which pertained to voluntary public vaccination against smallpox, is applicable to the present situation and should be carried out. This regulation provides that when smallpox is epidemic and vaccination is necessary to prevent the disease in districts where it does not then exist, the health officer in each municipality, or if none, the chairman of the board of supervisors of each town, shall arrange for the free voluntary vaccination of the inhabitants of the health district, providing that the governing body of such municipality shall appropriate funds therefor.

MISSOURI

Death of Mrs. Dock.—THE JOURNAL notes with much regret the death following a tonsillectomy of the wife of Dr. George Dock, Pasadena, Calif., formerly dean of Washington University Medical School, St. Louis.

Proposed Liquor Legislation.—The Missouri Antisaloon League announces that it will attempt to have introduced in the next legislature a bill to prohibit physicians from writing prescriptions for intoxicating liquor and to prohibit druggists from selling it.

Cost of Smallpox.—The health commissioner, St. Louis, Dr. Max C. Starkloff, in an address before the Optimists' Club, December 11, said that it costs the city more than $150 to care for every case of smallpox, but that to prevent a case of smallpox by means of vaccination costs 4 cents.

New State Board Member.—The governor has appointed Dr. James Stewart, St. Louis, a member of the state board of health to succeed Dr. Rudolph S. Vitt, St. Louis, who was recently elected coroner. Dr. Stewart for several years has been director of hygiene of the public schools of St. Louis, and in 1905 was a member of the state legislature.

Health Week.—Vernon County health week was observed at Nevada, November 3-7, under the auspices of the Vernon County Board of Health, the Vernon County school system, the farm bureau, and the Vernon County medical and dental societies. The program comprised a health survey of the various schools, an operative trachoma clinic, the organization of the women's auxiliary of the Vernon County Medical Society and lectures by local and visiting speakers.

Personal.—Dr. John L. Lavan, Kansas City, has been appointed city physician by the hospital and health board.——Dr. Rudolph S. Vitt has been elected coroner of St. Louis to succeed Dr. Edward L. C. Richter, it is reported.——Dr. G. A. Auerswald, De Soto, has been appointed state food and drug commissioner.——Dr. Richard L. Sutton, Kansas City, who recently returned from an expedition into Africa, representing the University of Missouri Department of Natural History, has presented a collection of trophies to the University.

Report of Hospital Committee.—The St. Louis Medical Society held a special meeting, December 11, to consider the report of the hospital committee. The committee recommended that the society request that physicians and their families be given the same reduced rate for hospital service as is allowed ministers and nurses, that clinic patients be admitted to free wards only after their finances have been investigated; that the hospital make no contract with industrial concerns, and refrain from advertising; that interns

who failed to complete their service in one hospital be barred from others. These resolutions failed of adoption.

Medical Legislators.—The state legislature which convenes next month at Jefferson City will have six physicians members of the house and one of the senate. The former will be Drs. John D. Dunham, Pattonsburg; John W. Holliday, Tarkio; David A. Pollard, Calhoun; Richard Ray, Kansas City; William H. Bailey, Perryville, and A. P. Drury, Bloomsdale. The senator is Dr. Guy B. Mitchell, Branson. Mr. Jones H. Parker, St. Louis, of the house, a practicing attorney, is also a graduate in medicine and the owner of "Annals of Otology, Rhinology and Laryngology."

NEW JERSEY

Personal.—Dr. Samuel E. Robertson, Newark, who has been medical director of St. James Hospital for many years, has retired from that office, to be succeeded by Dr. John F. Condon, Newark. A testimonial dinner was tendered to Dr. Robertson by the board of directors and the staff of the hospital.

Chiropractic Standards of Quackery.—The court of errors and appeals, October 30, affirmed a judgment for 6 cents against Dr. William A. Tansey, in favor of a chiropractor whom he had called a quack and a fakir. THE JOURNAL stated, November 15, that the court had set this judgment aside. According to the New Jersey court, a chiropractor in that state is not to be characterized as a quack and a fakir if he practices according to chiropractic standards, as chiropractic has been recognized by the New Jersey statutes.

NEW YORK

Infantile Paralysis.—Dr. LeRoy W. Hubbard, state department of health, reported, December 13, that there had been 800 cases of infantile paralysis, many of them in adults, reported this year, and that in the last four years more than 2,000 known cases of infantile paralysis have occurred. Dr. Hubbard estimates that there have been as many more cases mild enough to go unrecognized.

Foreign Bacteriologists to Study Filtrable Viruses.—Six especially qualified bacteriologists, one from England, France, Belgium, Italy, Germany and Denmark, will arrive in New York late in December, at the invitation of the Rockefeller Institute for Medical Research, for a three months' course of study in methods of cultivating and identifying certain filtrable micro-organisms isolated by Drs. Olitsky and Gates.

Award of Nichols Medal.—The New York section of the American Chemical Society has awarded the Nichols Medal for 1925 to Edward C. Franklin, Ph.D., professor of organic chemistry, Stanford University, California. Professor Franklin was president of the American Chemical Society last year, chief, division of chemistry, U. S. Public Health Service, 1911-1913, and in 1906, a member of the U. S. Assay Commission.

Society News.—The Suffolk County Medical Society elected Dr. George H. Schenck, Southampton, president, at its one hundred and eighteenth annual meeting, recently, Dr. James S. Ames, Babylon, vice president; Dr. Frank Overton, Patchogue, secretary, and Dr. David H. Hallock, Southampton, treasurer.——Dr. A. V. Hill, professor of physiology, University of London, spoke under the auspices of the University of Buffalo in Buffalo, November 8, on "Some of the More Startling Discoveries of Modern Times Concerning the Human Body."——Dr. Axel Reyn, director of the Finsen Light Institute, Copenhagen, recently lectured at the University of Buffalo.——Dr. Alphonse R. Dochez, professor of medicine, Columbia University College of Physicians and Surgeons, will lecture under the auspices of the Harvey Society at the New York Academy of Medicine, January 17, on "Etiology of Scarlet Fever."

New York City

Dinner to Dr. Fowler.—Prominent Brooklyn physicians and the staff of the Wyckoff Heights Hospital gave a testimonial dinner at the Montauk Club to Dr. Russell S. Fowler, December 2, in celebrating his twenty-five years of service as chief surgeon of the Wyckoff Heights Hospital.

Nurses Aid Medical Center.—The alumnae and students of the Presbyterian Hospital School of Nursing have voted to raise $1,000,000 as their part in building the proposed medical center at Broadway and One Hundred and Sixty-Fifth Street. This sum is the amount necessary for the construction of a separate building on the grounds to be used as a school and dormitory for the Presbyterian Hospital nurses.

Nassau Society Election.—The Nassau County Medical Society, at its annual meeting, Mineola, L. I., December 19, elected as president, Dr. Guy F. Cleghorn, Mineola; vice president, Dr. Louis A. Van Kleeck, Manhasset; secretary-treasurer, Dr. Arthur D. Jacques, Lynbrook. Dr. James N. Vander Veer of Albany, chairman of the legislative committee of the Medical Society of the State of New York, addressed the society.

Bust of Dr. Flexner.—At a dinner at the Ambassador Hotel, attended by about 200 persons, a portrait bust of Dr. Simon Flexner, director, Rockefeller Institute for Medical Research, was presented to Dr. Flexner, December 13. Dr. William H. Welch, Baltimore, gave the address of presentation, and other addresses were made by John D. Rockefeller, Jr., Dr. Phoebus A. Levene, Prof. Augustus Trowbridge, Ph.D., and Prof. T. H. Morgan. Mr. Raymond B. Fosdick was toastmaster.

Pharmacists Present Epitomes.—The Bronx County Pharmacy Association has just purchased from the American Medical Association 200 copies of the Epitome of the U. S. Pharmacopeia and National Formulary for free distribution among physicians of that county. The chairman of the professional relationship committee of the Bronx Pharmacy Association writes that the object is in this manner to discourage the prescribing of proprietaries and that another 200 copies of this little book may be wanted before long.

Academy Requests Hospital Assistance.—The Public Health Committee, New York Academy of Medicine, has sent the following letter to the presidents of the boards of trustees of hospitals:

> In view of the fact that the origin of the present outbreak of typhoid fever in the city has not as yet been definitely ascertained, the Public Health Committee of the New York Academy of Medicine urges the hospitals to assist the department of health in its efforts to trace the source of the infection by furnishing as completely and early as possible, all the data and clues which may be obtained from the histories of typhoid fever patients.

Conference on Water Pollution.—The joint investigating committee of the legislature has held a series of conferences with reference to the serious pollution of the waters about New York. The legislative resolution under which the committee functions calls for legislation by New York and New Jersey. The object is to get Congress to control the situation. It has been stressed at these conferences that immediate action must be taken to reduce the volume of disease producing refuse now pouring into the harbor from every side.

Meeting of Pediatricians.—The annual joint meeting of the New England and the Philadelphia Pediatric Societies and the Pediatric Section, New York Academy of Medicine, was held in New York, December 14. After a breakfast at the Yale Club, the societies went to Mount Sinai Hospital, where a scientific program was provided, then to clinics at Roosevelt Hospital, the Rockefeller Institute and the Post-Graduate Hospital, where luncheon was served. In the afternoon, the Carnegie Station for Experimental Evolution at Cold Spring Harbor was visited, and after a dinner at the Hotel Belmont, Carl Ackley gave an address on his trip to Africa.

Hospital News.—The Jewish Memorial Hospital announces that it has endowed beds for the treatment of worthy charitable persons suffering from diseases of the rectum, and that Dr. Arthur A. Landsman is in charge of the service. Application for admission to this service should be made to the superintendent.——The contracts for the 1,000-bed Veterans' Memorial Hospital, Kings Park, were awarded, December 3. There will be nineteen buildings. The cost, $3,000,000, will be allotted from the $50,000,000 bond issue recently approved by popular vote.——The House of Calvary in the Bronx, which cares for terminal cases of malignant disease, has just added a new wing which doubles its capacity, now 200 beds.

Embargo on Fowl.—Numerous cases of an unidentified disease of chickens, almost invariably fatal, caused an embargo to be placed, December 12, against shipments into New York from several western states. Health Commissioner Dr. Frank J. Monaghan signed the following resolution:

> WHEREAS, The board of health is satisfied that a disease of a pestilential nature now exists among chickens produced in the states of North Dakota, South Dakota, Missouri, Kansas, Illinois, Indiana, Iowa and Nebraska; and,
>
> WHEREAS, The shipment of chickens from above named states may be dangerous or detrimental to the lives and health of inhabitants of the city of New York for food purposes; therefore, be it
>
> *Resolved*, That the board of health of the city of New York hereby declares an embargo against the entry of all chickens from the above named states and prohibits and forbids the entry into the city of New York of any and all chickens produced from the said above named sources.

Typhoid Fever.—With fifteen new cases of typhoid reported, December 22, the present outbreak amounted to about 400 cases under observation. The commissioner of health pointed out, it is reported, that the victims were scattered among the five boroughs of the city and that the situation was under control. The department was confident that there was no cause for fear of either the water or milk supply, and while the cause of this outbreak had not then been determined, the health commissioner expressed the opinion, it is reported, that automobile touring might be responsible. He warned tourists not to drink water which had not been tested while on the road, to be vaccinated against this disease and to abstain from eating uncooked shellfish until it could be definitely ascertained what the source of the outbreak was. The board of estimate has made a special appropriation of $50,000 to combat typhoid fever and to meet the expense of enforcing the embargo on live poultry from eight central and western states.

NORTH CAROLINA

Hospital News.—Mecklenberg County has voted $100,000 for the establishment of a county sanitarium for tuberculosis, the construction of which will be started within a few months.

Personal.—Dr. Joseph Howell Way, Waynesville, president of the state board of health, was recently elected chairman for the 1925 session of the Southern States Conference of Presidents and Secretaries of State Boards of Health and State Medical Societies.

NORTH DAKOTA

Society News.—Dr. William C. Fawcett, Starkweather, president of the North Dakota Medical Association, addressed the Kotana Medical Society, November 7, at Williston on the need of organization of the medical profession. Dr. Alexander J. McCannel, secretary of the North Dakota Medical Association, spoke on the need of a rearrangement of the councilor districts. Every physician in Williston but one and every physician in Williams and McKenzie counties but two were present.

OHIO

Personal.—Dr. William H. Carey, Bellefontaine, has been reelected county health commissioner for Logan County.

Society News.—Dr. Auguste Rhu, Marion, was elected president of the Marion County Medical Society, December 2, Dr. Clifford G. Smith, vice president, and Dr. Dana O. Weeks, secretary.——Dr. Arthur H. Stall, Akron, was elected president of the Summit County Medical Society to succeed Dr. Edward S. Underwood. Dr. Carl R. Steinke was named president-elect and Dr. Alexander S. McCormick was reelected for his eleventh term as secretary-treasurer.——Dr. George E. Pfahler, professor of radiology, University of Pennsylvania Graduate School of Medicine, Philadelphia, addressed a general meeting of the Academy of Medicine of Toledo and Lucas County, December 5, on "Radiation in the Treatment of Deep Seated Malignant Disease."——Dr. Truman W. Brophy, Chicago, addressed the Columbus Academy of Medicine, November 3, on "Cleft Palate Surgery." The Muskingum County Academy of Medicine at a meeting in Zanesville, November 5, voted an increase of dues from $7 to $10, to care for its proportionate share of the expenses of the district society.——Dr. Hugh Cabot, dean, University of Michigan Medical School, Ann Arbor, addressed a joint meeting of the Williams, Defiance, Fulton and Henry County medical societies, at Bryan, October 21, on "Urology."

OKLAHOMA

County Health Unit.—The commissioners adopted the full-time health unit plan for Oklahoma County, December 3, and offices will be opened, January 1. In the budget of $8,500, provision is made for a county health officer, nurse, sanitary inspector and a clerk, all on full time. The state of Oklahoma, the U. S. Public Health Service and a tuberculosis society will cooperate and contribute toward this fund.

PENNSYLVANIA

Study of Encephalitis.—The department for mental and nervous diseases of the Pennsylvania Hospital, Philadelphia, has begun a prolonged study of children who are suffering from the effects of encephalitis. The personnel includes full-time psychiatrists, psychiatric nurses, psychologists and occupation teachers. A ward and a playground have been set apart for this purpose.

Prize for Devotion to Ideals.—Dr. Frederick W. Coover, for fifty years a practitioner in Dauphin County and formerly president, Harrisburg Academy of Medicine, offered, December 15, a prize of $500, to be awarded in 1928 to that fellow of the academy who demonstrates the greatest devotion to the ideals of the profession, research work in the academy and general progress in his profession. A committee of the five oldest former presidents of the academy will make the award, which the winner must use for further study. The offer was unanimously accepted by the academy.

Philadelphia

Hospital News.—A permit has been issued by the bureau of building inspection for the erection of a $175,000, six-story nurses' home at 1012-1018 Spruce street for the Jefferson Hospital.——To make way for a new $1,250,000 hospital unit, the Germantown Hospital, Germantown, is being moved bodily to another site on the hospital grounds.

TENNESSEE

Plans to Enlarge School of Medicine.—The trustees of the University of Tennessee, at Memphis, December 10, outlined plans to enlarge the medical school to a capacity of 1,000 students by 1928, it is reported. The present enrolment is 218. Funds to build the first unit in the plan of expansion will be asked of the legislature at the coming session.

TEXAS

Society News.—Dr. William D. Jones was elected president of the Dallas County Medical Society at the annual meeting, December 11; Dr. James S. Calhoun, vice president, and Dr. William W. Fowler, secretary, reelected for a sixth time.——At the eighty-eighth semiannual convention of the North Texas Medical Association, December 10, Fort Worth, Dr. John H. McLean, Fort Worth, was elected president, Dr. Marcus S. Seely, Dallas, vice president, and Dr. William S. Horn, Fort Worth, secretary-treasurer (reelected).

VERMONT

Medical Education.—In a discussion of public health problems before the Vermont State Medical Society recently, the decrease in the number of physicians in that state was considered. There are, it was said, 104 towns in the state that have no physician. There are today 757 physicians in the state, while twenty-five years ago there were 875. The medical department of the University of Vermont, to maintain which the state appropriates $35,000, graduated last year thirty-four in the senior class, only fifteen of whom were from Vermont.

Public Health Problems.—In a discussion of public health problems before the Vermont State Medical Society, at the last annual meeting, St. Johnsbury, the secretary of the state board, Dr. William G. Ricker, sought the society's opinion as to whether the clinics of the state board were considered desirable and necessary or whether they should be modified or dropped. The Vermont State Board of Health, Dr. Ricker said, conducts venereal disease clinics and supervises clinics for the after-treatment of poliomyelitis victims. It has not yet taken up child welfare clinics, mental hygiene clinics and others which other states support. The venereal disease clinics were started during the World War, when Congress appropriated money for the control and treatment of venereal patients. At first, Vermont received from this appropriation $4,000 per year, but this has been reduced until last year the state received less than $340 from the federal government. During 1923, clinics were maintained by the board of health at Rutland, Barre and two in Burlington. Recognizing the assistance to the board of the state's physicians and the meagerness of fees received for this assistance, Dr. Ricker said that when one gets up at 5:30 in the morning and returns home at 11 p. m., spending ten of the intervening hours on the St. J. & L. C. milk train attending the meeting of the state board of health in Burlington, and receives $4 and allowances therefor, the fee of 25 cents for posting a notice appears proportionate.

VIRGINIA

Health Officers Appointed.—Dr. Samuel Downing has been appointed acting health officer of Newport News, and Dr. Horace G. Longaker, who has been acting health officer since the resignation of Dr. Coleman B. Ransone, October 1, has been appointed assistant health officer.

GENERAL

The Trudeau Anniversary.—The forty-ninth anniversary of the founding of the Trudeau sanatorium movement for tuberculosis will be celebrated in January, 1925. Edward Livingston Trudeau was the first president of the National Tuberculosis Association and a pioneer in sanatorium treatment.

Interfraternity Conference.—Delegates from fifty-seven fraternities in more than 100 colleges and universities held an interfraternity conference, New York, November 28-29, at which the encouragement of higher education and the consolidation of smaller organizations into two or more fraternities were discussed. Among others, Dr. Harry E. Mock spoke on "Chapter Health and Sanitation."

Dinner to Foreign Delegates.—Col. Joseph Uzac, of the French War Ministry Medical Service; Col. Robert Picqué, associate professor of anatomy in the Bordeaux Faculty of Medicine, and Capt. Martin W. Flack of the British Air Force Medical Service, delegates to the recent meeting of the Association of Military Surgeons of the United States, San Antonio, Texas, November 13-15, were tendered a dinner at the Union League Club, New York, November 28, attended by many prominent New York physicians.

Limitation of Liquor Prescriptions Upheld.—The United States Circuit Court of Appeals held, December 19, that Congress acted within its constitutional rights when it restricted the physician in the amount of liquor he may prescribe for a patient in a given period. The decision was rendered on an appeal from the district court in *Lambert* v. *Yellowley et al.*, and reverses the decision of Judge Knox in the lower court, which held unconstitutional so much of the national prohibition acts as limits the quantity of liquor to be prescribed.

American Association for the Study of Goiter.—This organization will hold its annual meeting, January 28-30, at Bloomington, Ill. The first day will be devoted to operative clinics, the second to diagnostic clinics with a banquet in the evening, the third to diagnostic endocrine and hypothyroid clinics and round table conferences on goiter surveys. Membership in the association is open to all members of state medical societies. The annual fee is $5. The primary object of the association is to bring together each year men who represent the best that has been "thought, said and done" about goiter and the associated problems.

Study of Pharmaceutic Education.—The committee in charge of the encouragement of educational research, under the auspices of the Commonwealth Fund, assumed at the outset that there was need for economy of time in the educational process, and set out to test this assumption by extended studies, one being an analysis of the preparation needed for a profession, pharmacy being chosen for study. Prof. Werrett W. Charters, Ph.D., University of Pittsburgh, undertook the study. It has been in progress almost two years, and probably will be completed before the end of next year.

National Board of Medical Examiners.—Written examinations in both Parts I and II will be held by the board in February. The fourteen candidates examined by the Subsidiary Board of Chicago in Part III last summer passed and will receive certificates. All but one of the twenty-one candidates examined by the Subsidiary Board of Boston in Part III in the fall passed and will receive certificates. The last *National Board Bulletin* notes that Dr. Howard T. Karsner, professor of pathology, Western Reserve University School of Medicine, Cleveland, was elected a member of the board at its last annual meeting, to succeed Dr. Louis B. Wilson, whose second term of office had expired.

Howard University Needs Buildings.—In his annual report to Congress, the Secretary of the Interior points out the urgent need for new buildings and equipment for the Howard University School of Medicine, Washington, D. C. It is impossible to train classes of more than fifty students at present. This is an injustice to students who devote two or more years to college work to prepare for studying medicine, and who are then refused admission because of lack of room. With one exception, Howard University is the only institution in the United States which has a school of medicine for colored people exclusively. The endowment of $500,000, pledged during 1922 and 1923, permitted an increase in the faculty, but funds are not available for the construction of suitable buildings. The $500,000 petitioned for from Congress is urgently needed, according to the secretary's report.

Report of Carnegie Corporation.—According to the annual report of the president of the Carnegie Corporation, submitted to the board of trustees, November 20, the assets of the Carnegie Corporation are $133,659,024.17, and the income during the year, $7,397,714.13. The largest grant made during the year, $16,327,376.25, was to the Carnegie Institute of Pittsburgh. Other large grants, on which reports of progress are made, are the National Research Council and the National Academy of Sciences, $5,000,000; Food Research Institute at Stanford University, Calif., $704,000; Johns Hopkins University Medical Department, Baltimore, for an outpatient building and diagnostic clinic, $2,000,000, and New York Academy of Medicine, $1,000,000. Among various grants made during the current year are $85,000 to the University of California for a study of pyorrhea, and $43,000 to various agencies for research in insulin.

Federal Child Labor Amendment.—At the November election, Massachusetts was the only state which conducted a referendum on the question of ratification or rejection of the proposed Twentieth Amendment to the Constitution. Massachusetts rejected the amendment by a large majority. With the assembling of many state legislatures next month the fate of this proposed amendment probably will be determined, but the situation in Massachusetts indicates that legislators, there, who favored ratification, did not accurately gage public opinion on this question. A resolution was adopted at a mass meeting in Philadelphia, December 6, under the auspices of the Sentinels of the Republic, opposing ratification for several reasons, one of which was that the amendment would bring in accentuated form the evils of bureaucracy—more meddling, more job holders, more taxes. Thus far, one state, Arkansas, has ratified the amendment, and four—Georgia, Louisiana, North Carolina, Massachusetts—have rejected it.

The Cramton Bill.—Opposition of the National Association of Retail Druggists to the Cramton bill, creating a bureau of prohibition in the Treasury Department, independent of the Bureau of Internal Revenue, will be withdrawn if a board of appeals is created. This statement was made by Samuel C. Henry, secretary of the association, as a witness before the Senate Judiciary Committee. Opposition to the Cramton bill is based on the fact that it provides for no appeal, except to the courts. Mr. Henry stated that during the past three years many regulations and orders have been issued by the prohibition unit which could not be carried into effect by druggists. A review of such orders was permitted to be made by the Commissioner of Internal Revenue and in numerous cases they were revised or annulled. The National Druggists Association proposes the creation of a board of review, to consist of three members, one chosen by the Secretary of the Treasury, one by the Attorney General and one by the Secretary of Commerce.

Disease in the Aggregate.—The notifiable disease which occurs annually in this country has for several years been summarized in *Public Health Reports*. This enormous aggregate of infection, last year, was composed in part as follows:

	Number of Cases Reported
Measles	676,718
Influenza	403,934
Scarlet fever	175,540
Whooping cough	160,971
Chickenpox	153,195
Diphtheria	147,599
Pneumonia	121,572
Mumps	52,267
Typhoid fever	34,617
Pellagra	7,317
Poliomyelitis	3,245
Anthrax	147
Smallpox	30,907

The total, 1,968,029 cases of notifiable disease, does not include chronic diseases and some infectious disease in some states.

Pan-American Sanitary Conference.—With the return of Surgeon General Cumming, U. S. Public Health Service, from the Pan-American Sanitation Conference at Havana, Cuba, which adjourned November 15, more detailed information is known regarding the conference. Perhaps the most important action was an agreement made unanimously by the representatives of eighteen countries represented for the passage in their respective countries of a pure food and drug law. The adoption of such a law will be undertaken by the medical representatives of these countries. Stress is laid on the fact that the action taken was unanimous and will tend to bring harmony and uniformity of action on

sanitation and health matters in the countries referred to. The conference adjourned after agreeing to the adoption of the Pan-American Sanitary Code. The code retains practically all of the existing treaty agreements between the Pan-American countries on the subject of sanitation and the spread of disease among the countries signatory to existing treaties. The existing treaties, however, are revised in such a way as to make restrictive quarantine regulations more uniform, modern and complete.

Report of Children's Bureau.—The chief of the Children's Bureau, U. S. Department of Labor, in the annual report for the fiscal year 1924, says that the Children's Bureau received many requests during the year to undertake research with reference to the prevention of sex delinquency among children, and methods of care of those who have become delinquent, and that the Children's Bureau has authority to undertake this work but no appropriation available. There is a need for current statistics on a national scale relating to the number of dependent, delinquent and neglected children, as well as to the number of children legally employed. At present such statistics are secured only once every ten years. Among the most important studies made by the bureau were the following:

A demonstration to prove that rickets may be eradicated through methods applicable to any community was carried on in cooperation with Yale University School of Medicine and the New Haven Department of Health. It is to cover three years, one year having been completed.

An investigation of the relation of posture to physical fitness was conducted in cooperation with the public schools of Chelsea, Mass., and the Boston Community Health Service.

Standards of administration of mothers' pension laws have been studied in Massachusetts, Ohio, Illinois, Michigan, Washington, California and Manitoba, Canada. Forty-two states have such laws, about 130,000 children are receiving aid, and about 43,000 families are kept together.

At the request of the Georgia State Department of Public Welfare and the Georgia Children's Code Commission, a study was made of the care available to dependent, neglected and delinquent children in thirty counties of Georgia.

LATIN AMERICA

Ministry of Health in Chile.—The *Crónica Médica* of Concepción, Chile, just received, is jubilant over the recent organization of the public health service as a government department. It congratulates the country, further, on the selection of Dr. Alejandro del Rio as the first chief of the new ministry, saying that he is not only qualified scientifically for the task but has displayed talent in organization in his work in the Asistencia Pública of Santiago as director of the hospitals and charities service. He is one of the three editors of the large quarterly *Revista de Beneficencia Pública*.

Reciprocity with Mexico.—At a recent meeting of the Mexican Medical Association, the committee report on the question of medical reciprocity aroused a lively discussion. The committee urged that the government be appealed to not to sign any new treaties providing for reciprocity in the practice of medicine, and not to renew the present treaties when they expire. Brioso Vasconcelos opposed the suggestion, saying that the lack of a reciprocity treaty between Mexico and the United States had worked great hardships on Mexican physicians who had settled in the Southern states. He emphasized that the capital of Mexico is a cosmopolitan city, and there is no reason why honorable physicians of different nationalities should not work side by side, while no reciprocity treaty would have any effect in preventing practice by quacks. Drs. Rojas Avendaño, Escobar and others argued for the adoption of the committee report, and it was voted by the assembly.

FOREIGN

The Medical Salon.—The annual exhibition of works of art or handicraft by physicians and members of their families is to be held at Paris, March 8 to 20, 1925, in the rooms of the Cercle de la librairie, 117, boulevard Saint-Germain. This is the fifth exhibition of the kind, and appeals are being made to the profession and also to dentists, pharmacists and veterinarians to help make the exhibition as complete as possible. Dr. P. Rabier, 84 rue Lecourbe, Paris, is in charge.

Cancer Research by the League of Nations.—In addition to the systematic work now going on under the auspices of the League of Nations in England, Holland and Italy, it is proposed to invite suggestions of names of persons who would be willing to volunteer to act as secretary in their own country, to report to the League of Nations the work and the publications bearing on cancer in their environment. The research in the three countries mentioned above has already elicited the fact that 33 per cent. of the fatal cases of mammary cancer in England had not been operated on, and that in most of the others the operation had been comparatively late. Another fact considered significant is the higher cancer mortality among women in the United States among those of Italian nationality. Some features of this collective cancer research were mentioned in THE JOURNAL, Jan. 12, 1924, p. 137.

Insurance Against Professionally Acquired Disease.—The interns of the hospitals affiliated with the medical schools in France held an annual meeting to discuss occupational questions. The sixth Congrès de l'internat, recently convened at Montpellier, discussed means by which interns could be insured against disease acquired in their work. They accept that the solution of the problem must be sought outside the legislation on workmen's compensation. P. Boulet argued that the hospital administration should insure the interns against permanent disability or death, either in a regular insurance society or mutual aid, or by organizing an interhospital guarantee fund. Marsalet, on the other hand, argued that the hospital administration should not be held responsible, but that some form of regular insurance should be arranged with the organized insurance companies, impressing on them the youth of the candidates, their entirely different state of mind from the injured in the workmen's compensation class, and the exceptionally favorable conditions of their environment for rapid recovery. No official action was taken. The transactions are given in full in the *Bulletin de la Société des sciences médicales de Montpellier*.

Personal.—Lucien Viborel, Paris, France, is in the United States to secure information regarding antituberculosis campaigns. Mr. Viborel is director of an organization that is developing antituberculosis work in France.——The Abaytua annual prize awarded by the Academia Médico-Quirúrgica at Madrid was given this year to Dr. Mouriz Riesgo, Madrid, for his work "Serodiagnosis of Neurosyphilis."——Prof. V. Babés, Bucharest, has been awarded one of the nineteen prizes distributed this year by the Académie des sciences at Paris. The recipients of the other prizes were all French. ——Dr. René Leriche, agrégé professor of surgery at the Lyons Faculty of Medicine, has been called to the chair of surgery at the University of Strasbourg, which has been vacant for some time.——Dr. Egon Ranzi, privatdozent at Vienna, has accepted the position of professor of surgery at Innsbruck, left vacant by the removal of Prof. H. von Haberer to Graz.——Sir St. Clair Thomson has been appointed professor emeritus, laryngology, at King's College, London, and consultant surgeon for diseases of the nose and throat at King's College Hospital.——Frederick W. Twort, superintendent of the Brown Institution, gave a series of five lectures, December 11-17, at the Royal College of Surgeons, on "Bacteriologic Technic."——Professor Bergonié was recently appointed grand commander of the Legion of Honor. He has had to have several operations on account of roentgen-ray injuries, including amputation of one arm, but he is still at work in his laboratory at Bordeaux. He recently presented 100,000 francs to the fund for a cancer research station in southwestern France.——The Italian Isnardi prize has been awarded to Professor Macciotto of Sassari, and the two smaller prizes to Professors Pestalozza and Frontali of Florence.——Dr. Castiglioni, Varese, was presented by the local medical organization with a gold medal on the fiftieth anniversary of his entering on the practice of medicine.

Deaths in Other Countries

Dr. **John Irvine Hunter**, M.D., Ch.M., of Sidney, Australia, died of pneumonia in London, December 11. He was returning to Australia from America, by way of London and was invited by his former teacher, Prof. Elliott Smith, of the University of London, to deliver three lectures at the University College, London, on December 8, 10 and 12, on the subject of the anatomy and physiology of the sympathetic innervation of striated muscles. At the age of 22, Dr. Hunter was made associate professor of anatomy at the University of Sidney, Australia. At the age of 24, he became professor of anatomy, and was the youngest professor of anatomy in the history of that university. At the time of his death, aged 27, he was Challis professor of anatomy at the University of Sidney, and honorary consulting neurologist to the Lewisham Hospital, Sidney, Australia. His work on "The Influence of the Sympathetic Nervous System in the Genesis of the Rigidity of Striated Muscles in Spastic Paralysis" was widely known through the extensive notice given to it in both lay and medical periodicals.

Government Services

Course in Tuberculosis

Beginning Jan. 6, 1925, and continuing for sixty days, the U. S. Veterans' Bureau will give a postgraduate course in tuberculosis at Hospital No. 98, Beacon, N. Y. Dr. Nathan Barlow will be in charge. Among those to lecture are Dr. Allen K. Krause, Baltimore; Dr. Thomas McCrae, Philadelphia; Major Earl H. Bruns, U. S. Army, and Dr. Harry J. Corper, Denver; Dr. Gerald B. Webb, Colorado Springs, Colo., and Charles Edward A. Winslow, Ph.D., New Haven, Conn.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Dec. 9, 1924.

Leprosy in the Empire

An important lecture on "Leprosy as an Imperial Problem" was delivered before the Royal Institute of Public Health by Sir Leonard Rogers. The first reliable records of the spread of the disease, he stated, dealt with its invasion of Europe through Greece, about 350 B. C. It was carried probably by the armies of Darius. The armies of Pompey carried it to Rome in 62 B. C. Galen mentions it as having occurred in Germany in 180 B. C. By the ninth century it had spread all over Europe, and it was widely prevalent before the Crusades. It increased greatly from the eleventh to the thirteenth centuries, but diminished sharply in the latter part of the fourteenth. This decline Sir Leonard Rogers attributed in part to the black death of 1349, which is said to have carried off nearly half the population of Europe, and which doubtless struck down the weak rather than the strong. But the drastic segregation methods of the Middle Ages also played an important part. Spanish and Portuguese invaders carried leprosy to the Western World, where it was previously unknown. Later the slave trade added to the number of cases on the American continent. Other areas infected were New Caledonia, to which the disease was carried by a Chinese in 1865, and spread so alarmingly that within ten years from one fourth to one half of the people in some sections were attacked, and by 1910, no fewer than 90 per thousand of the native converts had become lepers. The epidemic spread to the Loyalty Islands and the Marquesas Islands, where, in 1909, the leprosy rate reached the appalling figure of 96.7 per thousand, or 200 times that of India. Therefore, leprosy still retains its powers of spreading. Sir Leonard feared that with the opening up of communications and trade routes the disease was now extending in tropical Africa, so that the problem remains a serious one for the British Empire. The whole history of the spread of leprosy over the world was that of an insidious and slowly communicable disease, carried by armies or the immigration of infected races to previously immune countries.

WAYS OF TRANSMISSION

Sir Leonard Rogers gave figures to show that the prevalence of the disease is connected with damp heat, the wet areas of the tropics being the most severely affected. He also showed that leprosy is most common where people have most resistance to tuberculosis—that is to say, where "tuberculization," or the coming into contact with tubercle, and so developing an immunity to it, has not occurred. In other words, a close relation exists between the two diseases. Sir Leonard suggested that infection by mild tubercle of a large proportion of a population may render that population less susceptible to the infection of leprosy. The reverse, however, was not true, for primary tuberculosis was the most frequent fatal complication of advanced leprosy. The world contained at present probably some 3,000,000 lepers, of whom about 300,000 were known to be citizens of the British Empire.

PROPHYLAXIS AND TREATMENT

Sir Leonard Rogers gave figures to show the importance of segregation. Happily, the great difficulty of this policy—the control of early cases—is being reduced by the new treatment by chaulmoogra oil, for patients hasten to avail themselves of the hoped-for cure and so disclose their condition. These early cases are soon restored to a noninfective state, and thus prevented from becoming a danger. Some 50 per cent. of cases treated within three years of the onset cleared up completely, but only 25 per cent. of those of from three to fifteen years' duration did so. There were good grounds for hoping that the results will be permanent, in a large proportion of the earlier cases at any rate. Legalized compulsory measures should include notification, examination, isolation and the examination of all contacts.

Visit of American Physicians Next Year

The American ambassador attended a dinner given by Mr. Phillip Franklin (an American who is also a London surgeon) to the executive committee formed to entertain the Interstate Postgraduate Assembly of America in this country next June. It is expected that 500 United States physicians will take part in the visit. Mr. Kellogg said that he had to thank the committee in advance for the hospitality it was extending to the American physicians. When the American lawyers visited London, the number was expected to be 200 or 400, but 1,500 came with their families. The physicians would find, when they came, that there was nothing like British hospitality in the world. It was a good thing for such societies internationally to get together, and it was a splendid thing for the medical profession of the two countries. Other speakers were Lord Dawson of Penn; Lord Lieutenant; Sir Humphry Rolleston, president of the Royal College of Physicians; Sir John Bland-Sutton, president of the Royal College of Surgeons; Sir St. Clair Thomson, president of the Royal Society of Medicine, and Mr. F. P. Powell, president of the American Chamber of Commerce. They said that the various societies they represented were happy to have the opportunity to offer hospitality to the American physicians, and the importance of such intermingling to Anglo-American friendship could not be overestimated. Leading London hospitals are taking part in arranging the program of the American physicians' visit. Hospitality has already been offered by the Royal College of Surgeons, the Royal Society of Medicine, the Physicians' Society, and various American organizations in London.

Extended Health Insurance: Case of the Middle Classes

At a meeting of the Insurance Institute of London, an important discussion took place on the subject of extended health insurance. Lord Dawson of Penn, physician to the London Hospital, read a paper on "The Need for Extended Sickness Insurance." He said that the need for extension of sickness insurance was great under present conditions. The rich and comfortable could provide for themselves, and the poorest classes were provided for under the insurance Act. He was referring to the middle class, the majority of whom had not cash or income exceeding say, £400. Owing to the growth of knowledge, the necessity exists to investigate and treat illness more extensively and sometimes over a longer time. They involved, so far as the local management and organization, and so far other local services) cost. For example, in a case of pernicious anemia, it was important to investigate the cause. To do this might mean the use of stomach tube, chemical analysis and other methods. This means cost, and

sometimes an operation was needed to effect a cure—more cost. Kidney disease was investigated with more accuracy than in former days; it might be done sometimes by the aid of chemistry, electric illumination or radiology. To investigate and treat chronic cough might often need the work of the clinician, the bacteriologist and the roentgenographer. Again, while insulin had bettered the prospect of sufferers from diabetes, careful regulation was needed to insure success to this treatment—again cost. It followed that access to clinics and hospitals was needed to supplement treatment in the homes of the middle classes. The founding and support of such clinics or hospitals should be the joint responsibility of the individual citizens and the community. Certain dangers should be avoided. Local authorities were apt to favor whole-time physicians, paid by salary. Multiplication of whole-time specialists, however, was bad, and was the slippery slope that led to nationalization. It separated a patient from the physician of his choice, and removed from the physician the intellectual stimulus of good work. Touching on the difficulties, Lord Dawson said there was the tendency for the less healthy to insure and the more healthy to stand out. This would be partially met by insuring all the members of families. A man was apt to think that Nature would make an exception in his own case, but not in the case of his wife and children. Next there was the big difficulty of administration and inspection to prevent abuses. He suggested that the formation of health societies in local communities might be a way out. The local health society would be a buffer between the insured and the insurance company, would control abuse of benefits, and incidentally help to administer the hospital or clinic. Then there was the difficulty of the company not knowing with sufficient accuracy its liabilities. This might be met by fixing a maximum payment in any one year.

In the discussion that followed, it was pointed out that a number of accident insurance companies had attempted in a small way to provide for individual insurance against illness, but people showed an unwillingness to pay the price. Some life companies had tentatively added a disability policy to their life policy, but that was a life-long contract, and its results had still to be seen. Collective family insurance was a different matter, which it would be attractive to think out. It was suggested that the need should be met, perhaps, not by the state, not by the insurance companies, but rather by the local communities for their own members, when the local health society had convinced them that they ought to provide for the need. It was also suggested that the cost of the benefits Lord Dawson would like to provide would be so great that the individual would have little left for life insurance or anything else. An actuary said that he had great difficulty at the moment in defining a plan on which a policy could be devised and a rate of premium fixed for the kind of insurance undertaking. Increasing cost following continual medical improvements opened up the possibility of heavy loss.

It is to be noted that this suggested insurance scheme differs from the national health insurance one in an important respect. The benefits of the latter are enjoyed entirely by a class termed exclusively, by an extraordinary abuse of language, "the working class"; but they are mainly paid for by the "middle class," which is now declared to be badly in want of health insurance, probably unable to pay for it. A current delusion, fostered by political agitators, is that all those outside the so-called "working class" are wealthy persons who live by "exploiting" the former. The truth is that the middle class works the harder, though more with its brains, and that any material advantages now left to it after the payment of grinding taxation are the fruits of superior skill and thrift. Indeed, when their responsibilities are taken into account, a large part of the middle class is not so well off as many members of the working class; but as these persons do not form combinations (to the injury of the community) and have comparatively few votes, the politicians simply tax them to pay for what they are pleased to call "social reform"; in other words subsidies in various forms for the "working class."

RIO DE JANEIRO

(From Our Regular Correspondent)

Nov. 15, 1924.

Practice of Medicine by Foreign Physicians

One of the subjects most discussed in medical societies all over the country and also in the house of representatives and the newspapers, is the practice of medicine by foreign physicians. As Brazil is a new country with an immense territory open for immigration, the influx is large, especially from Portugal, Italy, Germany, Syria and Spain. One result is that physicians from these countries also come to Brazil. Before the law enacted this year, foreign physicians had to take only three examinations, covering pathology, physiology, therapeutics, anatomy, clinical medicine, clinical obstetrics and any two special subjects of their own choosing. This system proved too lenient. The house of representatives, in which there are a number of physicians, determined to establish a more rigid control. A bill prepared by Drs. Zoroastro Alvarenga and Clementino Fraga requires foreign physicians to comply with the following provisions: 1. A regular six year course in an official school must be completed. 2. In addition to possessing a college degree, candidates must submit to an examination in Portuguese and geography and the history of Brazil, after studying these subjects in any Brazilian high school. The bill authorizes foreign professors to practice here, provided Brazilian professors are allowed the same privileges in their respective countries.

Psychotherapy in Nervous Diseases

An interesting discussion took place in the National Academy of Medicine with regard to the value of psychotherapy in nervous diseases, and especially in neurasthenia. The two sides of the question were discussed by Drs. Antonio Austregesilo, professor of clinical neurology, and Dr. Henrique Roxo, professor of clinical psychiatry. Professor Austregesilo, after twenty-five years' use of psychotherapy in his clinic, believes that the method has an absolute value in such conditions. In his brilliant lecture, he showed the evolution of psychotherapy through the works of Charcot, Dubois, Dejerine, Babinski, Thomas, Bernheim, Levy, Freud and Coué. He even supported Coué's method, mentioning some cases in which autosuggestion had yielded splendid results. However, he also employed some drugs. Professor Roxo, while believing that psychotherapy is a great help, denied its unique value, and drew a line between the cases of hysteria and of neurasthenia. The first is cured with any method of persuasion. It proves different with the latter, which is a more complex process. In contrast to the patient with hysteria, the neurasthenic is not a "malade imaginaire." In neurasthenia, there are two separate elements—psychasthenia and nervousness. The patient may be afraid of going insane, as he is conscious of some trouble in his head. This trouble may be caused by cenesthetic changes, a circulatory disturbance or a venous stasis in the brain. Under such conditions, if one convinces the patient that the remedy is going to control and soothe the cerebral trouble, he will improve and his fears will disappear. Such psychotherapy is logical, although supported by drugs. Who can believe that any such patients may be relieved by Coué's method? Professor Roxo quoted several cases of gastro-intestinal and cardiac nervousness, which autosuggestion could not relieve at all. According to Roxo, the great fault of Coué's method lies in its not taking into account either emotional factors or functional

disturbances, even if we disregard its ridiculous technic. Of psychic therapy methods, the one deemed best by Roxo is some form of rational persuasion, which will fit in with modern views. In order that such a method may act as autosuggestion, the patient must accept and incorporate the idea into his mentality. For such purposes, the physician's influence has no rival.

The "Indian Method" Operation in Cataract

In the October, 1924, session of the National Academy of Medicine, Dr. Gabriel de Andrade presented a report of the "Indian method" operation for cataract, and exhibited many patients sucessfully operated. This is the first use of this method in Brazil, and the subject awakened much interest. Dr. Andrade described the technic and showed its many advantages, as well as some modifications he has introduced: 1. As he noticed some loss of vitreous humor in delivering the lens, as soon as one third or one half shows between the lips of the opening, he seizes it with Kalt forceps and finishes the extraction with a very gentle pull. He has had special forceps built for this purpose. With these he presses on the back part, and completes the extraction at the proper moment as his assistant used to do with the Kalt device. 2. The suture of the cornea is made in accordance with Liégard's technic. Thus, better results are secured, not only because intracapsular incisions are more extensive, but because the wall that holds back the vitreous humor is weakened after the operation. 3. He brings about temporary paralysis of the eyelids through injections of cocain or procain in the facial nerve, according to the method of Van Lint or Villard. This helps in preventing any loss of vitreous. Dr. Andrade said that Smith's operation had not become more popular, because of the skill required to carry out the difficult technic.

Tribute to Dr. Brasil

The ophthalmologist Dr. Moura Brasil, director of the General Policlinic of Rio Janeiro, recently completed fifty years of professional practice. Physicians from all over the country determined fittingly to celebrate the occasion. December 10 there will be unveiled, in the policlinic building, a brass plate with his portrait, and special sessions will be held in his honor by the National Academy of Medicine and the Society of Medicine and Surgery. Several physicians will dilate on the life and activities of this noted representative of Brazilian medicine.

BERLIN

(From Our Regular Correspondent)

Nov. 29, 1924.

Deaths Caused by Impure Barium Sulphate, Used in Roentgenography as a Contrast Agent

According to a report of the federal department of public health, several deaths have occurred recently in Germany and also in foreign countries through the use of barium sulphate as a contrast agent in roentgenography. The barium sulphate was in these cases found to be strongly contaminated with soluble barium compounds or with compounds that became dissolved by human gastric juice. Of itself, barium sulphate, when it is pure, is a harmless agent for roentgenographic transillumination purposes, as has been proved beyond question during the last fourteen years since Prof. Paul Krause (formerly in Bonn, now in Münster) introduced this insoluble barium compound into medical diagnosis for the purpose mentioned. On the basis of replies to a questionnaire sent to directors of various institutions, Krause and Köding have reported that in approximately 130,000 cases barium sulphate has been employed as a roentgenographic contrast agent without causing any injury whatever. This statement agrees with the observations of analytic chemistry, which teaches that, from a practical standpoint, barium sulphate may be regarded as a substance that is insoluble in water or in dilute hydrochloric acid. To be sure, Prof. L. Lewin (pharmacologist in Berlin) has expressed the view that also pure barium sulphate may find in the human organism the required conditions for going into solution, but this view lacks confirmation. Barium has speedily supplanted bismuth subnitrate, which was formerly employed, and cannot be replaced by magnetic iron ore (magnetite), which has occasionally been recommended. In the two recent cases in which loss of human life has resulted from the use of barium sulphate, the preparations of barium sulphate employed were found to contain upward of 50 per cent. of barium carbonate. Such accidents can be avoided if manufacturers, pharmacists and physicians will see to it that for the purposes mentioned only pure preparations are manufactured, sold or applied. The federal department of health has got in touch with representatives of two large pharmaceutical houses that produce barium sulphate for transillumination purposes, and it would seem that the manufacturers are taking great precautions in selecting the original material as well as in the manufacture and distribution of barium sulphate, in order that accidents may be prevented. The federal public health service has gone still further in its investigation, and has examined all the more common market brands of barium sulphate and of barium sulphate mixtures containing various suspension substances and sweetening agents, with a view to discovering the content, if any, of barium carbonate and soluble barium compounds. None of the samples examined contained admixtures in sufficient quantity to be deleterious to health, but were, for the most part, essentially free from injurious substances.

In order that it may be possible for every physician and, if necessary, for the care-taking personnel to establish, by the use of simple agents and with little loss of time, the unobjectionable character of an unknown or suspected preparation, the Prussian minister of public welfare has issued instructions for the testing of barium sulphate, which have been worked out in the federal department of health on the basis of the testing regulations published by the German Apothecaries Society in its supplement to the Deutsches Arzneibuch (the pharmacopoeia of Germany). This method has proved reliable, and in order to ascertain just how small quantities of barium carbonate occurring in barium sulphate may be demonstrated by this test, mixtures of pure barium sulphate and barium carbonate containing, respectively, 2.1, 0.5, 0.2, 0.1, 0.05 and 0.01 per cent. of barium carbonate were prepared and then subjected to the test. It was found that a barium carbonate content of 0.05 per cent. could easily be demonstrated, while a barium carbonate content of 0.01 per cent. could be just barely detected.

The minister demands that the manufacturers of barium sulphate for roentgenographic transillumination purposes take note of the great danger that threatens patients for whom barium sulphate is thus employed if the preparation used contains even minute quantities of barium carbonate or soluble barium compounds. For a single illumination, from 100 to 150 gm. of barium sulphate is used. The manufacturers concerned must therefore exert their best efforts to prevent anything but pure barium sulphate from being put on the market. Furthermore, he recommended that the attention of physicians and pharmacists be called to this test of barium sulphate for its content in barium carbonate or soluble barium compounds, but urged that they be reminded that barium sulphate mixtures cannot be tested by this simple and sure method, as their suspensions cannot be so readily clarified and filtered. While, under ordinary circumstances, there is no occasion to test barium sulphate preparations, if, in an individual case, for any reason one of these preparations

is suspected, it should not be used until it has been carefully tested in an official chemical laboratory and has been found to be pure.

The official method of testing barium sulphate for its content in barium carbonate and soluble barium compounds follows: About 5 gm. of the barium sulphate to be examined is placed in a flask or beaker; 50 c.c. of a 10 per cent. solution of acetic acid is added and the contents are shaken, at which time it should be noted whether or not carbonic acid is developed. Since any evolution of carbonic acid would point to the presence of barium carbonate, such a finding would awaken grave suspicions against the preparation, and it should not be used for roentgenographic transillumination purposes. As a rule, no evolution of carbonic acid will be noted, and after the contents of the flask have been boiled for a few minutes, the undissolved barium sulphate is allowed to settle and the supernatant fluid is poured off through a filter paper. The resulting filtrate, which will usually be turbid, is then thoroughly shaken after a small quantity of animal charcoal on the point of a knife has been added. The filtrate is then refiltered if necessary two or three times until it has become entirely clear. To about 25 c.c. of the clear filtrate a few drops of dilute sulphuric acid are then added. If inside half an hour the filtrate becomes turbid, the preparation should be rejected, as it contains 0.1 per cent. or more of barium carbonate or soluble barium compounds. If the filtrate remains clear, the barium may be safely used as a contrast agent in roentgenographic work.

Industrial Hygiene in Prussia

In 1921, the Prussian ministry of state decided to appoint five *Gewerbeärzte*, or industrial physicians so called, as an aid to the technical industrial inspectors. For this purpose, Prussia was divided into four industrial medical districts: Düsseldorf, Arnsberg, Erfurt and Breslau.

The activities of the industrial medical councilors, who began their work, Jan. 1, 1922, include the following range of duties: (1) to assist with advice and by every means possible the officials charged with the general inspection of industry, including the mining industry, with reference to the problems of industrial hygiene; (2) a scientific inquiry into the morbific changes that occur in the organism of workmen under the influence of their industrial occupations; together with considerations as to their prevention and best means of treatment, and (3) the development of the general problems of hygiene in the various lines of industry.

The industrial medical councilors are expected to pay particular attention to the hygienic details of factory administration (dressing rooms, washrooms, bathrooms, toilets, cleaning and ventilation of workrooms, and the elimination of dust, fumes and gases) and to the provision of first aid for the injured. Furthermore, they will collaborate in the appointment and supervision of the physicians entrusted with the examination of workmen employed in industries injurious to health and will see to it that proper quarters are provided for the severely injured. They may also assist in the solution of problems pertaining to the contamination of water, air and soil and to complaints in regard to undue noise from industrial plants.

The industrial medical councilors will also aid in the collection of statistics on occupational diseases and mortality. In cooperation with the regular industrial inspectors, they will inquire into the processes of manufacture in general use and will study industrial diseases and poisonings occurring in industrial plants. Under certain circumstances, it may devolve on them to institute a systematic examination of certain branches of industry; if necessary, with the aid of experimental laboratory research. They may be called on to aid in the determination of the individual capacity and adaptation of workmen and general employees. The industrial medical councilors will keep in touch with the health insurance societies and the factory physicians; also with the administrative officers of the county and district. They will familiarize themselves with the problems of the employers' and the workmen's unions, and by lectures or informal talks will seek to awaken an interest in and a sympathy for the aims of industrial hygiene.

The industrial medical councilors will work hand in hand with the industrial inspectors and the inspectors of mines. In all questions that arise they are the representatives of the administrations to which they are attached.

With the aid of the industrial medical councilors, the following problems have been investigated of late: the conditions of health among painters' apprentices who are using lead paints to a great extent; among workmen in quarries and stone workers, and among workmen in glass-making establishments, including those employed in the grinding of glass; preventive measures to avoid the dangers to health involved in the preparation of films in motion picture studios, where the lights used are causing eye injuries among those employed. A law has been drafted concerning the notification of industrial poisonings. An inquiry has been instituted into the enforcement of hygienic regulations in barber shops; especially those in factories and in garrisons. Experimental investigations have been carried on with regard to the problems of the industrial working day; especially with reference to the performance of workmen under various conditions. Excellent work has been done in preparing discussions of the problems on the programs of the third, fourth and fifth sessions (1922, 1923 and 1924) of the International Labor Conference held in Geneva.

MADRID

(From Our Regular Correspondent)

Nov. 15, 1924.

Spanish-American Medical Congress

The first Spanish-American Congress was held in Seville about the middle of October. For one thing, it succeeded in shaking the medical profession out of its usual apathy, and for a few days enthusiasm was really wonderful. The meeting was a success so far as attendance is concerned. About 3,000 physicians registered; from Latin America there were more than 500. The guests must all have returned to their different countries praising Spanish hospitality, as everybody here tried to show them every possible courtesy. The king, after receiving in Madrid many of the Latin America delegates, went all the way to Seville to open the congress. In his speech he expressed again his regard and admiration for medicine and its representatives. The delegates from the Spanish-American countries pleaded for a closer union with the mother country. It seems that of all efforts made so far with this purpose, this meeting has proved the most far reaching.

Seville was chosen as the meeting place because the tomb of Columbus is located there and the first Ibero-American exposition is now being organized there. As a tribute to Latin Americans, the date chosen for the meeting was the same as that on which Columbus landed for the first time on American soil. This much was forgotten, however, in Seville, which is the sunniest place in the world; it rains only in October. Even this year, when the whole country was moaning over the long spell of aridity, Seville was the only place where it rained. Everybody missed the bright sun, for which the city is widely known. From the scientific standpoint, the congress was a success. It is to be hoped that the proceedings will be published, as complaints are still being made because the proceedings of the first Spanish

medical congress were not put in print. Through some omission, the members were not informed as to the meeting places of the different sections, nor were signs placed to convey the information. The physicians were therefore under a serious handicap, as regards both the presentation of their own papers and listening to what others had to say. The wide distance among the different buildings assigned to sections, plus the constant rain, put to a severe test the patience of some of those present.

Fortunately, the Andalusian hosts, with their generosity and natural wit, helped to erase all unpleasantness. At Jerez de la Frontera, a city made famous the world over by sherry wine, some merchant princes offered an entertainment unequaled on similar occasions. Messrs. Domecq, the owners of the well known cellars, tendered a banquet to the members of the congress. Their hospitality did not end here, as each diner was presented with a case containing six bottles of their best wines. This banquet cost the hosts more than 100,000 pesetas (about $14,000). Other vine growers also presented the members with samples of their wines. Messrs. Gonzales Byas spent 25,000 (about $3,500) for the same purpose, and the city council 75,000 pesetas ($10,500) more. Thus, 200,000 pesetas ($28,000) was spent altogether to entertain the physicians in their eight hours' Jerez trip. The members had been forewarned, since the surgeon Dr. Aranda had delivered a lecture in Seville describing the wines of his native land, which, according to him, are unmatchable as regards vitamins.

In brief, here is a record of the congress: Seville and Jerez sights; much praise to the Spanish-speaking race; a great deal of noise, and some science, but much on the quiet. Anybody who dares criticize such a congress is too hard to please. The next Spanish medical congress will be held at Valencia, and the next Spanish-American Congress in Buenos Aires. Let us hope that both will be as lively as the Seville meeting, although, we fear, more orderly.

New Journal

A few young physicians have undertaken the publication of a monthly entitled *Los Anales españoles de la Beneficencia Municipal*. This journal is devoted to the defense of the interests of the medical and pharmaceutical corps of the different Spanish municipalities. In view of the enormous number of such employees and the experience accumulated by them, the new publication may eventually prove to be one of the most important in Spain.

The Queen Consults Dr. Marañón

Dr. Marañón enjoys in Spain an unprecedented reputation. As he owes nothing to political influence, he feels justly proud of his independence. In his capacity of acting president of the Madrid Ateneo, a cultural organization closed by the army directory, which considered it a center of liberalism, Dr. Marañón had to see General Anido, minister of the interior. The minister, who is rather outspoken, in referring to some friends of Marañón, allowed himself to use some words resented by the latter. As a protest, Marañón resigned all his official positions, such as public health counselor and director of the Infectious Diseases Hospital. The government frowned at this attitude, and even threats, it is said, were made; but Marañón did not budge.

At this juncture the queen intervened. One afternoon, most unexpectedly, while Dr. Marañón was receiving in his office the patients that come to him from all over Spain, two ladies inquired for him. The attendant warned them that they would be unable to see the physician unless they had an appointment. "Tell him that the queen is here," was the reply. The attendant could not help inquiring, "What queen?" "The queen of Spain." The attendant burst on his master with the news. Dr. Marañón at first suspected something was wrong with the employee's mind. On coming out to straighten out things, he found that the queen was actually there, accompanied by her lady-in-waiting, the Duchess of Montellano. After this, the army directory did not bother Dr. Marañón any more. It may be added that at a recent meeting held in Paris, Marañón submitted a paper on basal metabolism in diseases of nutrition with more case reports than any of the other physicians who presented papers.

Death of Dr. Gómez Ferrer

Dr. Francisco Gómez Ferrez, professor of diseases of children in the Valencia Medical School, is dead. His passing away is much regretted, as everybody admired his generous personality and love for children. To them he devoted all his life, energies and science, and for them he organized hospitals, preventoriums and cooperative societies. Everything that might help children was studied by him abroad, and then copied or applied in Valencia.

Marriages

HERMAN HEMINGWAY TUTTLE, Springfield, Ill., to Mrs. Charles J. Sinnott of New Orleans, December 8.

HARRY WATSON MARTIN, Los Angeles, to Miss Sylvia Breamer of Riverside, Calif., November 1.

WILLIAM PHILIP COBB, Denver, to Miss Magdalene Huchthausen of Minneapolis, September 9.

CLARENCE H. BIRDSALL to Miss Elizabeth Pratt, both of Haverhill, Mass., September 20.

EDWARD G. THOMPSON to Miss Sammie Eunice Agee, both of Memphis, Tenn., October 30.

FRED ASWELL TURNER, Detroit, to Miss Anita Berndt of Nashville, Tenn., September 10.

JAMES T. WRIGHTSON to Mrs. Annie J. Johnson, both of Newark, N. J., November 25.

ROBERT I. LAW to Mrs. Sarah Isabelle Challender, both of Galesburg, Ill., November 5.

EDWIN J. BREWER to Miss Ethel Jackson, both of Shabbona, Ill., at Genoa, October 16.

Deaths

Eugene Solomon Talbot ✪ Chicago, well known as a leader in advancing the specialty of stomatology, died, December 20, aged 77 years, from internal hemorrhage associated with duodenal ulcer. Dr. Talbot was born in Sharon, Mass., March 8, 1847. He received the degree of D.D.S. from the Pennsylvania Dental College in 1871, and the M.D. degree from Rush Medical College in 1880. He also had conferred on him the degrees of LL.D. by Kenyon College in 1902, of M.S. by Whitman College in 1903, and Sc.D. by the University of Pennsylvania in 1915. He was an honorary member of the Sociedad Odontologica Española, the Odontologische Gesellschaft, l'Association Générale des Dentistes de France, the Chicago Pathological Society and many other scientific organizations. He was professor of stomatology in Rush Medical College, in the Illinois Medical College and in the Women's Medical College of Northwestern University. In the American Medical Association he was largely instrumental in founding the Section on Stomatology, and served as its secretary from 1901 to 1918 and as chairman from 1918 to 1919. He was also a delegate from the section in the House of Delegates in the 1921, 1922 and 1923 sessions. At Portland, Ore., in 1905, and again at Atlantic City in 1919, he was elected third vice president of the American Medical Association. Dr. Talbot contributed largely to the literature of his specialty, concerning himself particularly with histopathology of the jaws and dental tissues, gingivitis and dental neurology. His published books include "Degeneracy: Causes, Signs, Results," 1898; "Developmental Pathology, a Study in Degenerative Evolution," 1911; and "Intestinal Gingivitis and Pyorrhea Alveolaris," 1913. For his fundamental scien-

tific studies and for his leadership and ideals, both by precept and example, Dr. Talbot's name will have enduring memory.

John Nottingham Upshur ● Richmond, Va.; Medical College of Virginia, Richmond, 1868; past president of the Medical Society of Virginia, the Tri-State Medical Association (Virginia and North and South Carolina); formerly professor of materia medica, therapeutics, and the practice of medicine and lecturer on diseases of women and children, at his alma mater; Civil War veteran; for more than fifty years a practitioner in Richmond; aged 76; died, December 10, of heart disease.

Samuel Parker Hodges, Eagle Rock, Calif.; Hahnemann Medical College and Hospital, Chicago, 1867; Chicago Homeopathic Medical College, 1879; formerly a practitioner in Chicago; aged 83; died, December 14, at Los Angeles, of cerebral hemorrhage.

Calvin Norris Owen, Mobile, Ala.; University of Alabama School of Medicine, Tuscaloosa, 1888; member of the Medical Society of the State of Alabama; formerly member of the board of health; aged 61; died, December 2, following a long illness.

Edward S. Burnham, Charleston, S. C.; Medical College of the State of South Carolina, Charleston, 1870; also a druggist; formerly professor of pharmacology at his alma mater; confederate veteran; aged 79; died, December 4.

Peter H. Wessel ● Moline, Ill.; Homeopathic Medical College of Missouri, St. Louis, 1871; formerly member of the state board of health; for eight years mayor of Moline; aged 85; died, December 10, of cerebral hemorrhage.

George Doherty Bond, Fort Worth, Texas; Vanderbilt University Medical Department, Nashville, 1880; member of the State Medical Association of Texas; aged 64; died, December 6, at a local hospital, of pneumonia.

William De Blois Harris, Lynn, Mass.; College of Physicians and Surgeons, Baltimore, 1899; member of the Massachusetts Medical Society; aged 52; died, December 8, at the Lynn Hospital, of pneumonia and septicemia.

Carl Leonard Swanson, Omaha; University of Nebraska College of Medicine, Omaha, 1897; member of the Nebraska State Medical Association; aged 52; died, December 1, of epidemic (lethargic) encephalitis.

Jefferson F. Ohlinger, Jacksonville, Fla.; Starling Medical College, Columbus, Ohio, 1881; formerly a practitioner in Ohio; aged 64; died, November 28, at the Toledo (Ohio) Hospital, following a long illness.

Lot Ridgely Wilson, Baltimore; University of Maryland School of Medicine, Baltimore, 1880; member of the Medical and Chirurgical Faculty of Maryland; aged 66; died, November 29, following a long illness.

John Shanahan, Peabody, Mass.; Medical Department of the University of the City of New York, 1881; member of the Massachusetts Medical Society; aged 66; died, November 4, of acute dilatation of the heart.

Charles A. Bird, Detroit; Michigan College of Medicine and Surgery, Detroit, 1893; member of the Michigan State Medical Society; aged 62; died, December 7, at the Providence Hospital.

George Stanford Stebbins, Springfield, Mass.; Medical School of Maine, Portland, 1864; member of the Massachusetts Medical Society; Civil War veteran; aged 85; died, November 14.

Ambrose M. Gery, Coopersburg, Pa.; University of Vermont College of Medicine, Burlington, 1883; aged 63; died, December 8, of a skull fracture, received in a street car accident.

Laura Fellows Noyes, Rumford, Me.; College of Physicians and Surgeons, Boston, 1900; member of the Maine Medical Association; aged 61; died, October 27, of pneumonia.

David Wade Bedinger ● Captain, M. C., U. S. Army, Fort Riley, Kan.; Miami Medical College, Cincinnati, 1902; aged 45; was killed, November 25, in an aeroplane accident.

William H. Kirby ● Chestnut, Ill.; Chicago Medical College, 1877; also a druggist; formerly postmaster of Chestnut; aged 73; died suddenly, December 2, of heart disease.

Junia Ingraham Greene, Springfield, Mass.; Long Island College Hospital, 1899; member of the Medical Society of the State of New York; aged 49; died in November.

Andrew Anderson, St. Augustine, Fla.; Medical Department of Columbia College, New York, 1865; formerly mayor of St. Augustine; aged 85; died, December 1.

William A. Durrie, Jersey City, N. J.; New York Homeopathic Medical College and Hospital, 1878; aged 69; died, November 26, of myocarditis and pneumonia.

Ralph S. Ward, Bowling Green, Ky.; Kentucky School of Medicine, Louisville, 1891; Confederate veteran; aged 85; died, December 2, following a long illness.

Robert C. N. Cook, Lebanon, Ind.; Medical College of Indiana, Indianapolis, 1897; aged 64; was found dead in his home, December 11, of a bullet wound.

Herman B. Anderson, Noel, Va.; Medical College of Virginia, Richmond, 1882; member of the Medical Society of Virginia; aged 68; died, November 17.

Emmet Onslow Hayes, Denton, Texas; Atlanta (Ga.) College of Physicians and Surgeons, 1900; aged 55; died suddenly, December 2, at Wichita Falls.

Lawrence Elliott Bull ● Cheraw, S. C.; Medical College of the State of South Carolina, Charleston, 1901; aged 53; died, December 2, of heart disease.

Augustus Theodore Gaillard, New York; Medical College of the State of South Carolina, Charleston, 1897; aged 53; died, December 1, of pneumonia.

Frederick H. Lutze, Brooklyn; New York Homeopathic Medical College, 1882; aged 86; died, November 30, of chronic prostatitis and senility.

Henry Clay Stephens, Winamac, Ind.; Curtis Physio-Medical Institute, Marion, 1885; aged 70; died, November 28, at Crown Point, of pneumonia.

Abram Bradley Gaither, Baltimore; University of Maryland School of Medicine, Baltimore, 1887; aged 61; died, December 1, of cerebral hemorrhage.

Benjamin A. Tyler ● Royersford, Pa.; Medico-Chirurgical College of Philadelphia, 1894; aged 56; died, November 28, of heart disease and uremia.

James G. McBrien, Alton, Ill.; St. Louis (Mo.) College of Physicians and Surgeons, 1899; aged 61; died, December 3, of cerebral hemorrhage.

Edward David Gotchy ● Chicago; Dearborn Medical College, Chicago, 1904; aged 59; died suddenly, December 9, of cerebral hemorrhage.

John T. Cook, Bowersville, Ga.; College of American Medicine and Surgery, Macon, 1874; aged 82; died, November 24, following a long illness.

Richard W. Rice ● New York; College of Physicians and Surgeons, Baltimore, 1909; aged 52; died suddenly, November 28, of heart disease.

James Jeremiah Williams, Jr., New York; University and Bellevue Hospital Medical College, New York, 1906; aged 43; died, November 29.

Solomon Blumberg ● Pittsburgh; University of Warsaw, Russia, 1897; on the staff of the Montefiore Hospital; aged 52; died, December 1.

Frank S. Myers ● Youngstown, Ohio; Baltimore (Md.) Medical College, 1897; aged 55; died suddenly, November 26, at a local hospital.

Robert J. Williams, Humboldt, Tenn.; Eclectic Medical Institute, Cincinnati, 1865; Confederate veteran; aged 84; died, November 24.

George Edgar Bristol, Evanston, Wyo.; University of Vermont College of Medicine, Burlington, 1880; aged 72; died, December 4.

John Theodore King ● Baltimore; University of Maryland School of Medicine, Baltimore, 1866; aged 80; died, December 2, of senility.

Talbot Charles Gernon, Bloomington, Ill.; Rush Medical College, Chicago, 1889; aged 55; died, December 9, following a long illness.

John L. Dryer ● Santa Ana, Calif.; Cincinnati (Ohio) College of Medicine and Surgery, 1877; aged 79; died, November 30.

Joseph F. Stone, Clarksville, Tenn.; University of Louisville (Ky.) School of Medicine, 1875; aged 72; died, December 1.

Oswald Heribert Beckman, Glendale, Calif.; Jefferson Medical College of Philadelphia, 1884; aged 73; died, November 28.

William Victor Miller, Buffalo; University of Buffalo Department of Medicine, 1876; aged 74; died, November 25.

David L. Everhart, Malvern, Ohio; Baltimore (Md.) University School of Medicine, 1894; aged 57; died, December 2.

Mary Barnard Currier Wood, Boston; Boston University School of Medicine, 1893; aged 69; died, November 30.

W. W. Roberts, Provo, Ark. (licensed, Arkansas, 1913); aged 78; died, December 1, at Nashville, of senility.

Correspondence

"SALT TREATMENT FOR MINERS' FATIGUE"

To the Editor:—Though THE JOURNAL has an abstract section which covers most of the important medical literature, it probably does not include all articles of interest which appear in periodicals not at all devoted to medical subjects. It might be well to call attention, therefore, to an article in the *Colliery Guardian*, a leading English coal journal, October 10, entitled "Salt Treatment for Miners' Fatigue," by Sir Josiah Court.

Men working in hot mines, where the humidity is low and the temperature is over 100 F., frequently suffer from undue fatigue and occasional attacks of cramps. It was recently suggested that the cramps might be due to excessive loss of sodium chlorid through profuse and prolonged sweating, particularly when large quantities of water were drunk.

A few colliers were therefore chosen to test the effect of drinking a weak solution of salt in water, the proportion first tried being about 0.25 per cent., or 10 gm. per gallon of water. Such promising results were obtained that more men were prevailed on to put salt in their daily drinking water. Each collier carried a daily supply of 2 quarts, to which was added at home one teaspoonful to each quart of water.

The results were most gratifying. Six miners after a month's trial declared themselves to be less tired each day after work, and one no longer took his customary nap after reaching home. Another no longer had leg cramps, and the families of all reported greater energy evident at home.

Similar experiments on boiler stokers working at 96 F. in very dry air, in which one-half teaspoonful of salt was added to each quart of their daily ration of 2 quarts, showed that the workers all felt less tired on reaching home.

Whether the application of sodium chlorid in certain forms of fatigue is a new discovery I am not in a position to say; but in case it represents a complete innovation, I am sending this bit of information.

C. C. DAVIS, M.D., Winthrop, Mass.

APPARATUS FOR INFUSION OF SODIUM CHLORID SOLUTION

To the Editor:—The article of Dr. William H. Byford on "An Apparatus for the Infusion of Physiologic Sodium Chlorid Solution" (THE JOURNAL, November 29) describes an apparatus the principles of which are identical with the apparatus I described in THE JOURNAL, Feb. 9, 1918.

Dr. Byford's description of this apparatus and also his description of a similar apparatus for the transfusion of citrated blood, which appeared in *Surgery, Gynecology and Obstetrics* in August, 1922, were evidently given without his knowledge of a similar apparatus having already been described by me.

BEN N. WADE, M.D., Portland, Ore.

"THE LEPROSY SITUATION IN THE UNITED STATES IN 1923"

To the Editor:—Under this title, Frederick L. Hoffman, statistician, has given (THE JOURNAL, November 22) a survey of the distribution of leprosy in the United States. From his perfectly correct statement, a misunderstanding might, however, arise. He says that leprosy is not a reportable disease in New York State, but does not mention that in New York City the department of health requires it to be reported. The isolated case that he cites from New York State (Cattaraugus County) is in marked contrast to the twenty cases reported from California. As a matter of fact, there are probably more lepers in New York than in any other state of the Union except Louisiana. At the present time there are ten lepers in my service at the Riverside Hospital, while during the last two and a half years more than thirty such patients have been inmates of this institution alone. During the last year, twelve patients with leprosy have been seen at the Vanderbilt clinic. It would be conservative to say that for many years there have been from twenty-five to thirty or more lepers at all times in New York City.

HOWARD FOX, M.D., New York.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

MINERAL CONTENT OF POTABLE WATERS

To the Editor:—We are confronted here with water that is condensed and devoid of all mineral matter, except some iron, which is corroded from coils and carrying lines. We should like to know whether there is any preparation on the market that will make it the same in mineral content as a good spring water. We wish to know the combination in which iodin is usually added to water, and the weight of the salt which should be added to some stated volume of water, say a gallon or barrel. Is there any preparation on the market which, if added to condensed water, will make it the same in mineral content as a good spring water? Such a preparation could, of course, be compounded in this laboratory, but we prefer a preparation put out by some firm of recognized standing. The families could buy such an article at a drug store, and add it to the water used for drinking purposes. This arrangement would relieve the laboratory of much annoyance.

JAMES E. ROACH, M.D., Midwest, Wyo.

ANSWER.—The relation between health and the hardness of water supplies has been much discussed. There is no good evidence that the normal, healthy person is affected by either an excess or a deficiency of mineral salts in water. We do not depend solely on drinking water for our necessary supply of salts, since foods also furnish them. This is true not only of calcium and sulphur, but also of iodin. McClendon and Hathaway (THE JOURNAL, May 24, 1924, p. 1668) have recently reported on the iodin content of foods and of public water supplies. They calculate that the iodin content of drinking waters in goitrous regions should be 1 part in 100 million. Iodin is added to water in the form of sodium iodid. If one-tenth pound is added to a million gallons of water, the suggested amount will be obtained. In one city in this country, sodium iodid is being added to water in an amount such that the iodin content will be 50 parts per billion. It is still too early to draw any conclusions concerning the effect on goiter of the addition of iodin to water supplies. We know of no commercial preparation which can be added to distilled water in order to simulate a natural water.

OPERATING ROOM — HOSPITAL

To the Editor:—Please furnish information as to the following details of the operating room: (1) best color for walls and ceiling; (2) materials for lining walls, ceiling and floor; (3) best lighting system; (4) best hospital heating water system; (5) incinerators and possible use as a heating system; (6) best paint (color) for outside walls of hospital; (7) shades; (8) icebox.

J. A. ORTIZ, M.D., Santiago de Cuba, Cuba.

ANSWER.—1. Pale green seems to be most used, and unquestionably strains eyesight but little.

2. If means permit, opalite or other white glass or marble, or 6 by 6 inch glazed tile for walls and ceiling may be recommended; but, if economy requires, hard plaster painted with high grade gloss enamel is suitable for ceilings as well as walls. A 6 by 6 inch gray flint tile and coved base of the same material, the tile laid with close joints, is the most durable and satisfactory floor for an operating room. Many other kinds have been tried, but do not remain in a satisfactory condition for as long a time.

3. An installation of steel boxes containing corrugated mirror glass reflectors and lamps covered by prism glass doors set into the walls and ceilings flush with the surface of the plaster or tile complies with every desirable principle of operating room illumination, but costs the most. The lamps can be so placed and a sufficient number installed to make this form of lighting shadowless. It has no surfaces that gather dust over the operating table. It does not cast a shadow in daytime.

4 and 5. If steam is generated for any other purpose, it is the most efficient medium for heating water; in that case, a large tank with U or loop tubes for the steam may be recommended; however, on account of the high cost of fuel in Santiago it may be advisable to install a steel water heater of the garbage burning type in which rubbish, garbage, sawdust and other refuse can be burned. Such combination destructors and heaters are comparatively short lived, owing to the corrosion of steel plates from the moisture in garbage. If the water for domestic purposes can be heated by steam, a fire brick garbage destructor will be a more permanent equipment.

6. This would seem to be a matter to be determined by location. In warm climates, it would seem desirable to use light colors to reflect heat rays, colors such as cream, gray and, in some instances, white. Dark colors are more suitable in industrial districts where removing soot is either impossible or costly.

7. A window shade of a transparent holland on an adjustable spring roller, so that it can be raised or lowered that air and light can pass over the top is most satisfactory in our latitude.

8. Cork in the form of boards is undeniably a most efficient insulator. The inside of small boxes ought to be lined with white glass or porcelain, the floors of vitrified tile. The finish of the exterior, whether wood or metal, is immaterial. Large refrigerating boxes for the kitchen of a hospital can be lined with wood which has been sandpapered but not varnished, and will remain wholesome, if the insulation is good. It is not necessary to line them with tile or glass. There are too many refrigerator manufacturers producing poorly insulated boxes with whom quality does not receive first consideration, and who use felt or mineral wool, sawdust, air spaces, granulated cork, flaxboard, sugar cane board and other substitutes for cork.

"GLUCOSE AND OTHER AUTOMOBILE 'ANTIFREEZING' SOLUTIONS"

To the Editor:—In Queries and Minor Notes, THE JOURNAL, October 25, you publish information regarding glucose and other automobile "antifreezing" solutions. The recommended strength was from 15 to 20 per cent. Our observations are as follows:

20 per cent. glucose mixture will freeze at + 18 F.
33 per cent. glucose mixture will partially freeze at + 18 F.
50 per cent. glucose mixture will not freeze at + 18 F.

The specific gravity of this mixture is approximately 1.240. By diluting a little of the mixture, the specific gravity may be tested with an ordinary urinometer. We are using 50 per cent. glucose mixture (ordinary confectioner's white glucose) and believe it will be satisfactory.

E. R. SWIFT, M.D., Lakeview, Mich.

Speech After Cleft Palate Operation.—In my experience, good speech after operations for cleft palate is rare. Closure of the cleft, though difficult, is an easier problem to solve than is that of producing clear articulation. I firmly believe that the short soft palate, almost inevitable with our recognized methods of closure, is the cause of our failures, and that progress will not be made until we recognize and deal with this difficulty. Unless the newly formed palate is long enough to shut off, at will, the nasal from the oral cavity, articulation must be defective except for the sounds m, n and ng. To make such closure possible, the surgeon must diminish the gap between the posterior end of the soft palate and the posterior pharyngeal wall. To do this he must either make a longer soft palate or increase the forward prominence of the posterior pharyngeal wall, or do both.—Goyder, F. W.: *Brit. M. J.* 2:615 (Oct. 4) 1924.

Medical Education, Registration and Hospital Service

COMING EXAMINATIONS

ALABAMA: Montgomery, Jan. 13. Chairman, Dr. S. W. Welch, Montgomery.
ARIZONA: Phoenix, Jan. 6. Sec., Dr. W. O. Sweek, 404 Heard Bldg., Phoenix.
COLORADO: Denver, Jan. 6. Sec., Dr. David A. Strickler, 612 Empire Bldg., Denver.
DISTRICT OF COLUMBIA: Washington, Jan. 13-15. Sec., Dr. Edgar P. Copeland, 104 Stoneleigh Court, Washington.
HAWAII: Honolulu, Jan. 12. Sec., Dr. G. C. Milnor, 401 Beretania St., Honolulu.
ILLINOIS: Chicago, Jan. 6-8. Supt. of Regis., Mr. V. C. Michels, Springfield.
INDIANA: Indianapolis, Jan. 13. Sec., Dr. W. T. Gott, 333 State House, Indianapolis.
MINNESOTA: Minneapolis, Jan. 6-8. Sec., Dr. Thomas McDavitt, 734 Lowry Bldg., St. Paul.
NATIONAL BOARD OF MEDICAL EXAMINERS: Written examinations in Class A medical schools. Parts I and II, Feb. 18-20. All applications for this examination must be made on or before January 15. Sec., Dr. J. S. Rodman, 1600 Walnut St., Philadelphia.
NEW YORK: Albany, Buffalo, New York, Syracuse, Jan. 26-29. Chief, Mr. Herbert J. Hamilton, State Education Bldg., Albany.
NORTH DAKOTA: Grand Forks, Jan. 6. Sec., Dr. G. M. Williamson, Grand Forks.
OKLAHOMA: Oklahoma City, Jan. 13-14. Sec., Dr. J. M. Byrum, Shawnee.
OREGON: Portland, Jan. 6-8. Sec., Dr. U. C. Coe, 1208 Stevens Bldg., Portland.
PENNSYLVANIA: Philadelphia, Jan. 27-31. Pres., Dr. I. D. Metzger, 322 Aiken Ave., Pittsburgh.
RHODE ISLAND: Providence, Jan. 1-2. Sec., Dr. B. U. Richards, State House, Providence.
SOUTH DAKOTA: Pierre, Jan. 20. Dir., Dr. H. R. Kenaston, Bonesteel.
UTAH: Salt Lake City, Jan. 6. Dir. of Regis., Mr. J. T. Hammond, State Capitol, Salt Lake City.
WASHINGTON: Olympia, Jan. 12. Sec., Mr. Wm. Melville, Olympia.
WISCONSIN: Madison, Jan. 13-15. Sec., Dr. Robert E. Flynn, 315 State Bank Bldg., La Crosse.

Indiana July Examination

Dr. William T. Gott, secretary, Indiana Board of Medical Registration and Examination, reports the written examination held at Indianapolis, July 8-10, 1924. The examination covered 16 subjects and included 100 questions. An average of 75 per cent. was required to pass. Seventy-nine candidates, including 1 osteopath, were examined, all of whom passed. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent.
General Medical College	(1924, 8) 88.3, 89.1, 89.4, 90.6	79.3, 82.4, 84.3, 85.4,	
Indiana Univ. Sch. of Med.	(1923) 92.1, (1924, 60), 83.9, 84.5, 85.7, 86.1, 86.2, 86.6, 86.7, 87.4, 87.5, 87.6, 87.8, 88.2, 88.2, 88.4, 88.5, 88.5, 88.8, 89.1, 89.2, 89.3, 89.5, 89.6, 89.6, 89.9, 90, 90.1, 90.3, 90.4, 90.4, 90.5, 90.6, 90.8, 91.1, 91.1, 91.1, 91.3, 91.6, 91.7, 91.8, 91.9, 92, 92, 92, 92.3, 92.3, 92.6, 92.7, 93.1, 93.2, 93.3, 93.3, 94.2, 94.2, 94.4, 94.4, 94.7, 95.4, 96.2		
University of Louisville	(1924, 2)	91, 93.9	
University of Michigan	(1924)	89	
Washington University	(1924)	90.3	
Temple University	(1922)	85.5	
University of Pennsylvania	(1923) 89.6, (1924)	91	
University of Toronto Faculty of Medicine	(1920)	90.6	
National University, Athens, Greece	(1909)*	85.3	

Dr. Gott also reports that 82 candidates, including 3 osteopaths, have been licensed by reciprocity since Aug. 30, 1924. The following colleges were represented:

College	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
College of Physicians and Surgeons, Little Rock	(1911)		Tennessee
University of California	(1910)		California
Howard University	(1922)		Dist. Colum.
Atlanta School of Medicine	(1911)		Georgia
Emory University	(1915)		Georgia
Chicago College of Med. and Surg.	(1907) Illinois, (1917)		Missouri
College of Physicians and Surgeons, Chicago	(1908)		Illinois
Hering Medical College	(1910)		Illinois
Illinois Medical College	(1904)		Illinois
Loyola University	(1918)		Illinois
Northwestern University	(1898), (1903) (1908), (1914), (1922), (1923, 2)		Illinois
Rush Med. Col.	(1903), (1915), (1922, 2), (1923, 4), (1924)		Illinois
University of Illinois	(1919)		Illinois
Woman's Medical School of Northwestern University	(1894)		Illinois
Keokuk Medical College	(1900)		Missouri
Louisville Medical College	(1890) Kentucky, (1902) (1904) Illinois		Michigan
University of Louisville	(1903) Kentucky, (1913) (1923, 3) Kentucky		Tennessee
Johns Hopkins University	(1920)		Maryland
Detroit Homeopathic College	(1906)		Michigan
Univ. of Michigan Med. Sch.	(1891) Iowa, (1913), (1923)		Michigan

Kansas City Homeopathic Medical College	(1896)	Missouri
St. Louis University	(1921), (1923)	Missouri
Washington University	(1921)	Wisconsin
Fordham University	(1915)	New York
Medical College of Ohio	(1894)	Illinois
Ohio State University Coll. of Med	(1920)	Ohio
University of Cincinnati	(1922, 2), (1923, 4)	Ohio
University of Oklahoma	(1915)	Oklahoma
Willamette University	(1906)	Texas
Temple University	(1910)	Penna.
University of Pennsylvania	(1894) Illinois, (1913)	Dist. Colum.
Meharry Medical College	(1900) Arkansas, (1900), (1902) (1913, 3) Tennessee, (1916) Kentucky, (1916, 2), (1918) Tennessee	Mississippi
University of Nashville	(1905) Kentucky, (1906)	Tennessee
University of Tennessee	(1893)	Ohio
University of Vermont	(1899), (1918)	Vermont
Medical College of Virginia	(1922)	Virginia
Victoria University Medical Department	(1894)	Colorado
University of Berlin, Germany	(1913)	Colorado

* Graduation not verified by A. M. A.

Book Notices

THE PATHOLOGY AND TREATMENT OF DIABETES MELLITUS. By George Graham, M.A., M.D., F.R.C.P., First Assistant in the Medical Clinic, St. Bartholomew's Hospital. Cloth. Price, $2. Pp. 188, with 29 illustrations. New York: Oxford University Press, 1924.

Like many of the smaller books on diabetes mellitus now being published, this one will be found to contain the latest and best review of recent literature as interpreted from the special point of view of the author. Graham has always stood out as typical of the more conservative group of English clinicians, and this book represents his most recent activities. The first chapters deal with sugar in the blood and urine, sugar storage and regulation of blood sugar. The conditions of sugar excretion, with especial reference to the relation between height of the blood sugar level and point of excretion in the urine, are thoroughly discussed. Renal glycosuria receives a more critical and intensive treatment than this interesting anomaly usually receives. The clinical types of diabetes are well discussed, and as far as possible under the limitations of our present knowledge are well defined. The chapter on hypotheses as to the cause of the disease is as unsatisfactory as the subject itself. Treatment is interestingly and thoroughly handled; the similarities and differences between the method of Allen and that devised by the author are well brought out. Insulin and diabetic coma form the subject matter of the last two chapters. One who has finished the book has the feeling of a well spent little journey under the guidance of a master.

HANDBUCH DER KINDERHEILKUNDE. Ein Buch für den praktischen Arzt. Herausgegeben von Prof. Dr. M. von Pfaundler, und Prof. Dr. A. Schlossmann. IV Band. Third edition. Paper. Pp. 789, with 171 illustrations. Leipsic: F. C. W. Vogel, 1924.

With the appearance of the fourth volume of this encyclopedic presentation, the new Pfaundler and Schlossmann Handbuch is completed. The various contributions in this volume maintain the high standard of excellence of the previous volumes of the series. To Noeggerath and Eckstein has been assigned the consideration of the urogenital system of childhood. They discuss in the greatest detail the disturbances of the urinary organs and the pathologic conditions found by urinary examination. This includes a consideration of a great variety of affections of the kidneys, particularly those occurring in infancy and early childhood. Considerable space is devoted to a consideration of malformations, tumors, tuberculosis and parasitic infection of the urinary tract. The diseases of the genital organs of both sexes as they occur in infancy and early childhood are considered in sufficient detail to make this an important chapter for reading and reference. The chapter is concluded by a critical review of the anatomy and function as well as the pathologic conditions of the suprarenal capsule. Hemorrhage into these organs in infancy has a decided clinical interest, and is considered at some length. The effect of the infectious diseases on the suprarenal glands is also presented. Attention is called to the influence of diphtheria, sepsis, measles and scarlet fever, infectious diarrhea, tuberculosis and syphilis on these organs. The subject of tumors in these glands is a complete outline of the literature in this field. The remainder of the volume is devoted to a consideration of the nervous diseases of early childhood. Ibrahim of Jena discusses the organic diseases, and Theodor Gött of Munich considers the functional diseases. Diseases of the meninges are treated in an extensive and satisfactory manner by Bruno Salge of Bonn and Alexander Mendelssohn of Düsseldorf. The diseases of locomotion are considered by Joseph Husler of Munich. As a whole, for completeness of clinical descriptions, accuracy of pathologic detail and for completeness of bibliography, these volumes are unexcelled in modern pediatric literature. They should constitute a valuable reference work for decades.

ALLGEMEINE UND SPEZIELLE CHIRURGISCHE DIAGNOSTIK. Ein Lehrbuch für Studierende und Aerzte. Von Professor Dr. Max Kappis. Paper. Price, 15 gold marks. Pp. 652, with 601 illustrations. Berlin: Urban & Schwarzenberg, 1924.

This textbook on surgical diagnosis is designed especially for students and general practitioners. It aims to point out to the general practitioner when the aid of a surgeon should be sought. The author has been aided by Geheimrat Anschütz, who placed at his disposal the experience and excellent collection of illustrations from the Kiel clinic. The work is divided into three parts. Part I considers the general fundamentals of a surgical diagnosis, including the history, general findings, and local findings. Part II considers general surgical diagnosis, including wounds, wound healing, and surgical diseases of the various tissues. Part III comprises the major portion of the book, and deals with special surgical diagnosis. This is taken up regionally. The discussion under the various subheadings is taken up systematically and from the standpoint of clinical surgery. The differential points are clearly and logically presented, and are sufficiently detailed to be of real value. General subjects, such as acute peritonitis and conditions simulating this, are well handled. The illustrations are well selected and, for the most part, are original, so that the work is also an atlas on surgical differential diagnosis. The index is well arranged and sufficiently complete to render the book useful. The author has accomplished his purpose, and the book can be highly recommended.

OPERATIVE SURGERY, COVERING THE OPERATIVE TECHNIC INVOLVED IN THE OPERATIONS OF GENERAL AND SPECIAL SURGERY. By Warren Stone Bickham, M.D., Phar.M., F.A.C.S. In six volumes. Volume V. Cloth. Price, $10 per volume. Pp. 880, with 1118 illustrations. Philadelphia: W. B. Saunders Company, 1924.

In this volume are discussed the operations on the colorecto-anal tract, the kidneys and suprarenals, the ureters, bladder, male urethra, penis, scrotum, testes and the structures of the spermatic cord. More than a thousand well made illustrations add greatly to the value of the text as a definite means for imparting information. The thoroughness with which each subject is treated is to be commended; for instance, forty pages are devoted to the discussion of operations for hemorrhoids, especial stress being laid on the indications for each operation. Two hundred pages, with numerous illustrations, are given over to the discussion of operations performed for diseases of the rectum and anus; eighty pages to diseases of the colon. So many operations are described for the treatment of various pathologic conditions that the book is virtually a historical record.

NORMAL BONES AND JOINTS, ROENTGENOLOGICALLY CONSIDERED. By Isidore Cohn, M.D., F.A.C.S., Professor of Clinical Surgery, Tulane University. With a Foreword by Rudolph Matas, M.D., Professor of General and Clinical Surgery, Tulane University. Cloth. Price, $10. Pp. 218, with 251 illustrations. New York: Paul B. Hoeber, Inc., 1924.

This volume is similar to the preceding three volumes with the exception that the French and Spanish translations of the captions underneath the illustrations in the text and in the explanations of the plates have been omitted. The object of this volume is to present a study of normal bones and joints from a roentgenologic standpoint as a standard for comparison. The author has endeavored to clear up the confusion that exists in regard to the number of epiphyses for a given bone; the relationship of the respective epiphyses to one another at varying periods during the time necessary for the completion of ossification; the earliest evidence of ossi-

fication within the respective epiphyses, and the time at which union between the completely ossified epiphyses and the diaphysis occurs. These questions are answered differently by various authors in standard texthooks on anatomy and surgery. The author presents this subject of normal joints from a roentgenologic standpoint, laying particular stress on the surgical importance of such knowledge. The work is an atlas and text book of very high caliber, printed on excellent paper, so that the illustrations are clear and the text is easily legible. The subject matter is splendidly arranged and clearly presented. The author discusses, in order, the normal shoulder, elbow, wrist, hip, knee and ankle. Each chapter begins with a review of the literature and then presents observations based on a study of the normal joint, followed by interpretations of individual roentgenograms of the normal joint at various ages. With regard to the time of appearance of the centers of ossification in the various bones, a table is presented for each in which the statements of the various authorities are quoted. The book is extremely practical and should be in the hands of all surgeons and roentgenologists.

LES SOURDS-MUETS. Etude médicale, pédagogique et sociale. Par le Dr. G. de Parrel, et Mme. Georges Lamarque, Professeur a l'Institution nationale des sourds-muets de Paris. Préface de M. Dautresme, directeur de l'Institution national des Sourds-muets de Paris. Paper. Price, 35 francs. Pp. 445, with 162 illustrations. Paris: Les presses universitaires de France, 1925.

This rather extensive monograph opens with the subject of hereditary deaf mutism and its relation to syphilis and to consanguinity. The author then discusses the various forms of acquired deaf mutism due to meningitis and traumatism of the central nervous system. This is followed by investigation into the antecedents of the patient with reference to the family history. Emphasis is laid on the exact examination of the patient not only as regards the ear, nose and throat, but also the eyes and vocal mechanism. The importance of attention to the deaf mute before school age is noted, the treatment of the ear and eyes is outlined, and general hygienic measures are thoroughly discussed. Acoustic exercises for the education of the patient are given in detail. The second section contains a description of the various French institutions for the care of the deaf mute. Methods of instruction in the schools are well described, and many illustrations are used to demonstrate some of the methods of vocational training. The latter are described and accompanied with numerous pictures. The part played by the deaf mute in civil and political life as well as his participation in sports and other active games is discussed. The systematic and complete presentation, together with the numerous illustrations, makes the volume a valuable work to those who are interested in this important subject.

COMMON SYMPTOMS OF AN UNSOUND MIND. A Guide for General Practitioners. By G. Rutherford Jeffrey, M.D., F.R.C.P.E., F.R.S.E., Medical Superintendent, Bootham Park Mental Hospital, York. With a foreword by Sir James Crichton Browne, M.D., LL.D., D.Sc. Cloth. Price, $2.50. Pp. 268. New York: Paul B. Hoeber, 1923.

This book has been written to help the general practitioner to recognize the kind of insanity from which a patient is suffering and thus to enable him to decide whether commitment is necessary and to give better care to those who are to be treated at home. With this in view, the author discusses the time-old "symptoms" of insanity in separate chapters entitled: delusions; disorders of perception; exaltation, excitement and depression; mental confusion, and altered conduct. Under each the diagnostic meaning and pathologic significance are discussed in an extremely formal, almost compendial, manner. The nomenclature employed differs considerably from that in common use in this country, a fact that alone would considerably limit the value of the book in America. But, in addition, there is an almost complete lack of consideration of the dynamic psychologic point of view that has done so much to bring some real understanding of these artificially isolated "symptoms." Much also is taken for granted, and such terms as "mental enfeeblement" and "mental mechanism" are used freely without adequate explanation. While in full sympathy with the need for a wider and more general knowledge of mental disorders on the part of the profession in general, one cannot but feel that such schematic presentations will tend to perpetuate the all too prevalent rule-of-thumb diagnosis and treatment, and retard the realization of a true rationalization.

A PRESENT-DAY CONCEPTION OF MENTAL DISORDERS. By Charles MacFie Campbell, M.D., Professor of Psychiatry in Harvard University. Cloth. Price, $1. Pp. 54. Cambridge: Harvard University Press, 1924.

No one can read this little book without securing a broader understanding of human conduct and the meaning of happiness and disease. In spite of the wide range of the material covered in the short space of this one lecture, the subject is clearly presented and in language that is not too technical, though it does require some thought on the part of the reader. Mental disorders, under which term the author is not considering particularly the insanities and feeblemindedness, present themselves so commonly in everyday life and in so many guises that they are often overlooked. They are responsible not only for the various forms of nervousness and nervous breakdown but also for many of the oddities and peculiarities that many of us exhibit and that seem often so unintelligable. The views expressed in this book are well within the bounds of established clinical observation, and there is sufficient illustration from the facts of experience to satisfy the most skeptical. In spite of the extreme condensation the style is clear, and Dr. Campbell is to be congratulated on a real contribution to the more general understanding of this extremely important but much neglected field of medicine. The book should be read by every practicing physician.

ANATOMY OF THE HUMAN BODY. By Henry Gray, F.R.S., Lecturer on Anatomy at St. George's Hospital Medical School. Twenty-first edition, revised by Warren H. Lewis, B.S., M.D., Professor of Physiological Anatomy, Johns Hopkins University. Cloth. Price, $10. Pp. 1417, with 1283 illustrations. Philadelphia: Lea & Febiger, 1924.

Gray's anatomy is almost a classic in medicine. Since the appearance of the first edition in 1858, many notable advances have been made in the subject of anatomy, especially in so-called microscopic anatomy, or histology, and in the anatomy of the embryo. The present edition is probably not a bit like the first, but it represents the anatomic knowledge of today, although the text is primarily a descriptive anatomy of the human body. As in the twentieth edition, the special sections on embryology and histology remain with the subjects with which they naturally belong with the view also of emphasizing the unity of the three great divisions of anatomy. Each section has been revised to incorporate new knowledge; the section on the architecture of the heart musculature has been enlarged considerably, and much new material has been added to the sections on the ductless glands. The use of the B. N. A. nomenclature has been retained practically unchanged. The references to the literature appended to each section will be appreciated by those who have need of it. The original plan of the anatomy as written by Gray has been adhered to. Much of the original text persists, and even many of the original illustrations are still used. The present editor has made only such changes as were necessary to bring the work down to date, with addition of the newer anatomy reflecting the latest accessions to anatomic knowledge.

RADIUM, X-RAYS AND THE LIVING CELL. With Physical Introduction. By Hector A. Colwell, M.B., D.P.H., Assistant Radiologist, King's College Hospital, and Sidney Russ, D.Sc., F.Inst.P., Joel Professor of Physics, The Medical School, Middlesex Hospital. Second edition. Cloth. Price, 21 shillings net. Pp. 365, with 62 illustrations. New York: Harcourt, Brace and Company, 1924.

The authors have presented admirably the technical phases of radium and roentgen-ray phenomena. The reader is taken step by step from a simple beginning through the complicated portions in such a way that the subject becomes relatively simple and clear. Each chapter is supplemented by a bibliography which, from its extent, indicates a tremendous amount of preparation through collateral reading. The text indicates scientific ability of the highest order manifested by the results of personal investigations by the authors. The book is divided into two parts, the first portion covering the physical aspects of the subject, and the second part dealing with clinical applications and results. The effects of radiant

energy on the various organs and structures of the human body as well as on malignant and nonmalignant cell growth are well covered. Experimental results as to the chemical action, biologic influences and bacterial effects are so thoroughly shown as to make this work stand out prominently in the literature on this particular subject.

THE CHEMISTRY OF THE BLOOD IN CLINICAL MEDICINE. By O. L. V. de Wesselow, M.B., F.R.C.P. Chemical Pathologist and Physician to Outpatients, St. Thomas's Hospital. Cloth. Price, 15 shillings net. Pp. 255, with 12 illustrations. London: Ernest Benn Limited, 1924.

De Wesselow has no illusions about what is worth while in the chemical examination of the blood; he therefore considers its application chiefly to diabetes, nephritis, tetany and rickets. He has something to say about gout and various miscellaneous conditions, but he is not enthusiastic except when blood chemistry is of definite clinical value. Thirty pages of laboratory methods and tables supplement the text.

A PIONEER OF PUBLIC HEALTH, WILLIAM THOMPSON SEDGWICK. By E. O. Jordan, G. C. Whipple, and C.-E. A. Winslow. With an Introduction by Mary E. Sedgwick. Cloth. Price, $2. Pp. 193, with 5 illustrations. New Haven: Yale University Press, 1924.

A sympathetic, interesting and reliable sketch by pupils of a wonderful teacher of exceptional usefulness, who "loved great things and thought little of himself."

Medicolegal

Nominal Damages for Leaving Sponge—Judgment Reversed

(Russell v. Newman et al. (Kan.), 226 Pac. R. 752)

The Supreme Court of Kansas says that the plaintiff sued the defendants, two physicians, for malpractice, alleging that after removing his right kidney, May 30, they had negligently left within the incision a surgical gauze sponge 4 or 5 inches long and about 1½ inches in diameter, which remained there without discovery until August 7. A verdict was rendered in favor of the plaintiff, awarding him, however, only one dollar. He appealed, relying on the proposition that since the verdict necessarily amounted to a finding of negligence, the failure to allow him substantial damages showed passion and prejudice on the part of the jury and was contrary to the evidence.

Where a wrong is found to have been committed which obviously resulted in substantial injury, a verdict for merely nominal damages is not allowed to stand. Here the jury obviously concluded that the sponge was inadvertently and negligently left within the incision, but that no actual injury resulted from it. There were conflicts in the evidence. The plaintiff testified that when he left the hospital, June 18, he was told he was ready to go home, that neither of the defendants said a word to him about returning, and that he was given instructions for his own treatment. According to the defendants' evidence, when he left, June 18, he was told to return within a week or ten days for examination, and he promised that he would, but failed to do so. This dispute must be regarded as having been settled in favor of the defendants, so that any consequences of the incision going without examination after June 18 may be attributed to the plaintiff's failure to follow instructions. Again, his evidence affirmed, and the defendants' denied, that when the sponge was removed it had a foul odor. The plaintiff described his condition and feeling before and after the operation and before and after the removal of the sponge, telling of various pains and symptoms which he attributed to its presence. He also introduced medical evidence tending to support his contention in this regard. But against this the defendants produced the testimony of themselves and of other physicians that the leaving of the sponge within the incision was not likely to cause any serious results, and that whatever unfavorable conditions afterward manifested themselves were not attributable to its presence; on the contrary, that it was of actual benefit in promoting the healing process and hastening a recovery from the effects of the operation.

The rule that the testimony of witnesses skilled in medicine and surgery is necessary to determine whether specified acts constitute malpractice is subject to some qualification. For instance, it is said (21 R. C. L. 388):

> Probably the most common instance of malpractice which is brought into the courts arises out of surgical cases where the physician or attendant has left a sponge in the wound after the incision has been closed. That this is plainly negligence there is no doubt at all, and it matters not at all that many physicians testify that the best of surgeons sometimes leave a sponge or some foreign substance in the bodies of their patients, for this is testimony merely to the effect that almost every one is at times negligent.

The verdict rendered was an inconsistent one. If no injury was done the plaintiff, there was no justification for awarding even nominal damages against the defendants. They ought not to be penalized for doing the proper thing, even though they did it unintentionally. However, notwithstanding the testimony of the physicians to the contrary, this court is of the opinion that if, as the jury must be deemed to have found, the defendants negligently left the sponge in the incision where it remained undiscovered from May 30 to August 7, substantial injury to the patient must have resulted, and therefore a verdict for merely nominal damages should not be allowed to stand. Consequently the judgment rendered on the verdict is reversed, and a new trial ordered.

Two of the justices of the supreme court dissent.

Expert Testimony—Sources and Limits of Knowledge

(Stefanacci et al. v. Borden Farms Products Co. (N. J.), 125 Atl. R. 129)

The Court of Errors and Appeals of New Jersey says that, in this action to recover damages for personal injuries, objections were made to rulings by the trial court on questions propounded to medical witnesses. One of these asked a physician whether his experience had been sufficient for him to form an opinion as to the effect a concussion of the brain could have on a man who had had an injury to the brain and thereafter suffered dizziness and loss of memory. To the question objection was made that "it lets the witness judge, and is not an opinion." Whether the witness qualified as an expert was of course a court question; but the extent to which his knowledge might permit him to speak on matters within the purview of his science was a medical question on which he and those alike qualified could best express an opinion. It is a form of inquiry frequently encountered in the trial of causes of this nature, and seeks to elicit from the witness the possibilities in the science itself or the extent of his own attainments in the science. There are bounds to medical knowledge, and it is not improper that those bounds should be ascertained from him whose training and experience qualify him to speak. The physician referred to was asked also whether his reading and study entered into the opinion he had given. He answered in the affirmative, and a motion was made to strike out his testimony as based on his reading and study. The motion was properly denied. It is by reading and study, as well as by experience, that the expert becomes such. To deny him the right to use these, when called as an expert witness, would be to frustrate the whole theory on which the trained mind is admitted to express opinions in a court of justice.

Society Proceedings

COMING MEETINGS

American Pathological Society, Washington, D. C., Dec. 29-31. Dr. E. B. Krumbhaar, Chestnut Hill, Philadelphia, Secretary.

American Pharmacological Society, Washington, D. C., Dec. 29-31. Dr. E. D. Brown, University of Minnesota, Minneapolis, Secretary.

American Physiological Society, Washington, D. C., Dec. 30-Jan. 1. Dr. Charles W. Greene, University of Missouri, Columbia, Mo., Secretary.

American Society of Biological Chemistry, Washington, D. C., Dec. 29-31. Dr. Victor C. Myers, New York Post-Graduate Medical School, New York, Secretary.

Federation of American Societies for Experimental Biology, Washington, D. C., Dec. 29-31. Dr. E. B. Krumbhaar, Chestnut Hill, Philadelphia, Secretary.

Society of American Bacteriologists, Washington, D. C., Dec. 29-31. Dr. J. M. Sherman, Dairy Industry Building, Ithaca, N. Y., Secretary.

Southern Section of American Laryngological, Rhinological and Otological Society, Jacksonville, Fla., Jan. 19. Dr. H. Marshall Taylor, 111 West Adams St., Jacksonville, Chairman.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers to THE JOURNAL for a period of three days. No foreign journals are available prior to 1920, nor domestic prior to 1923. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested).

Titles marked with an asterisk (*) are abstracted below.

Boston Medical and Surgical Journal

191: 1009-1056 (Nov. 27) 1924

Life and Writings of Hippocrates. F. B. Lund.—p. 1009.
Radium Therapy. G. C. Wilkins, Manchester, N. H.—p. 1014.
Carcinoma of Buccal Mucous Membrane. C. C. Simmons, Boston. —p. 1018.
Treatment of Botulism. D. L. Sisco, Boston.—p. 1023.
Basal Metabolism VI: Complementary Tables of Values of Dreyer's Formulas. W. H. Stoner, Philadelphia.—p. 1026.
Basal Metabolism VII: Actual Versus Theoretic Weight in Dreyer's Formulas. W. H. Stoner, Philadelphia.—p. 1030.

Canadian Medical Association Journal, Montreal

14: 903-1004 (Oct.) 1924

Obstetrics During Past Twenty-Five Years. H. M. Little, Montreal. —p. 903.
Hematuria. J. T. Walker, London.—p. 909.
Tuberculosis and Calcification of Prostate. D. W. MacKenzie and M. I. Seng, Montreal.—p. 912.
Urea Concentration Factor in Estimation of Renal Efficiency. E. S. Mills and I. M. Rabinowitch, Montreal.—p. 915.
Treatment of Breast Cancer. F. Etherington, Kingston.—p. 917.
Surgical Treatment of Chronic Lesions of Breast. A. T. Bazin, Montreal.—p. 918.
Pathology of Chronic Breast Lesions. R. R. Graham, Toronto.—p. 921.
Anesthesia in Breast Operations. H. J. Shields, Toronto.—p. 929.
Silicosis in Ontario Gold Miners. J. H. Elliott, Toronto.—p. 936.
Empyema. A. J. Grant, London.—p. 938.
Empyema. A. L. Lockwood, Toronto.—p. 941.
*Dietetics in Treatment of Diabetics. W. R. Campbell, Toronto.—p. 944.
*Renal Glycosuria in Infant Twenty Months of Age. A. Goldbloom, Montreal.—p. 950.
Value of Roentgen Rays for Prognosis in Pulmonary Tuberculosis. A. H. Pirie, Montreal.—p. 953.
Pneumococcal Peritonitis. R. R. Struthers, Montreal.—p. 955.
Vitamin "A" and Its Variations in Cod Liver Oil. J. Dean, Toronto. —p. 959.
*Medullary Hypernephroma with Cranial Metastases. D. B. Leitch and H. M. Vango, Edmonton.—p. 962.
Varicose Aneurysm of Right Axillary Vessels. H. S. Dolan, Montreal. —p. 965.
Cutaneous Myiasis in Infant. Wohlfahrtia Vigil (Walker) Infection. C. Choun, Winnipeg.—p. 967.
Foreign Bodies in Bronchi. J. G. Strachan, Toronto.—p. 968.
Case of Early Dementia Praecox. B. Silverman, Montreal.—p. 970.
Congenital Deficiency of Small Intestine. R. R. McGregor, Kingston. —p. 971.
Diagnosis of Compression of Cord. F. H. Mackay.—p. 972.

Diet in Diabetes.—Campbell illustrates the production of a suitable menu for diabetics from a dietetic prescription, and discusses further certain problems in the dietetic treatment of diabetes. Menus are worked out; the approximate carbohydrate content of vegetables and fruits is given in table form on the basis of percentages, likewise the food values of commonly used foods. Several substitutes for the diabetic menu are also described.

Renal Glycosuria in Infant.—The glycosuria in Goldbloom's case was discovered at a time when the child had evidences of acidosis, and marked and rapid emaciation, suggesting at first glance a true diabetes mellitus. The chief point of interest in this case is the age, 20 months, at which the condition was discovered. This is the youngest case on record. The next point of interest is the presence of albumen and casts in the urine in the presence of glycosuria. The third point of interest is the familial nature of the disease, as exemplified by the presence of renal glycosuria in the father.

Hypernephroma with Cranial Metastases.—The case cited by Leitch and Vango is an example of the Hutchinson type, and was interesting because of the extensive skull involvement, the lack of orbital ecchymosis and the absence of a palpable abdominal tumor. Both suprarenals were involved.

Georgia Medical Association Journal, Atlanta

12: 469-514 (Nov.) 1924

*Etiologic Factors in Two Hundred and Ten Cases of Mental Breakdowns. J. N. Brawner and A. F. Brawner, Atlanta.—p. 469.
*Relation of Adherent Prepuce to Epilepsy. E. B. Block, Atlanta. —p. 473.
Surgical Problems in Carcinoma of Breast. M. C. Pruitt, Atlanta. —p. 477.
Some Phases of Cardiac Insufficiency. T. D. Coleman, Augusta.—p. 486.
Present Urologic Methods as Practiced in Europe. S. J. Sinkoe, Atlanta. —p. 488.
Infantile Diarrhea. G. S. Clark, Hartwell, Ga.—p. 492.
*Indican. W. W. Daniel, Atlanta.—p. 496.
Tuberculous Peritonitis Simulating Urinary Obstruction and Carcinoma of Rectum. C. O. Ritch, Chicago.—p. 499.

Causes of Mental Breakdown.—Of the 210 cases seen by the Brawners, in thirty-five, the mental breakdowns were due to a direct invasion of the brain by micro-organisms. In about 7.52 per cent. the psychoses were due to focal infections in other parts of the body. The next most important etiologic factor is defective constitutional make-up. Fifty-four patients showed that this was the main factor in causing the psychoses. About 10 per cent. of the cases were due to the ingestion of alcohol and drugs; 16 per cent. were acute autotoxic confusional and hallucinated states; about 5 per cent. were due to old age, cerebral softening, etc., and 3 per cent. were due to endocrine disturbances, which does not include the endocrine abnormalities found in dementia praecox. About 10 per cent. were due to various causes, such as defective food, prolonged physical work (usually in the hot sunshine), the puerperium, etc. About 7 per cent. were due to psychic shocks, or unbearable situations.

Relation of Adherent Prepuce to Epilepsy.—Adherent prepuce occurred in 11 per cent. of Block's cases of epilepsy and apparently played a part in the production of the convulsions.

Study of Indican.—The point made by Daniel is that from a physiologic point of view, cathartics, except an initial purge, are not indicated in the so-called cases of intestinal autointoxication; that the continued use of cathartics will aggravate rather than cure it. Secondly, that indicanuria is of clinical significance in these cases, and, thirdly, a change in diet and habits will relieve the tendency to constipation and clear up the symptoms.

Indiana State Medical Association Journal, Ft. Wayne

17: 367-402 (Nov.) 1924

Medical Economics. S. E. Earp, Indianapolis.—p. 367.
Trachoma Among Blackfeet Indians. L. W. Fox, Philadelphia.—p. 370.
Urologic Diagnosis for General Practitioner. B. Lewis, St. Louis.—p. 374.
*Acute Poliomyelitis Treated with Rosenow's Serum. C. C. Du Bois, Warsaw.—p. 381.
Compensation for Medical Services. J. L. Morse, Boston.—p. 382.

Rosenow's Serum in Acute Poliomyelitis.—DuBois reports two sporadic cases of acute poliomyelitis treated with Rosenow's antipoliomyelitis serum before paralysis with complete recovery without paralysis in either.

Journal of Pharmacology and Experimental Therapeutics, Baltimore

24: 259-334 (Nov.) 1924

*Barbital Narcosis. II. Blood Sugar and Blood Coagulation Time During Barbital Hypothermia. M. M. Ellis and O. W. Barlow, Columbia, Mo.—p. 259.
Hepatic Function. VI. A Pharmacologic Behavior of Certain Phthalein Dyes. B. Value of Selected Phthalein Compounds in Estimation of Hepatic Function. S. A. Rosenthal and E. C. White.—p. 265.
Action of Neo-Arsphenamin and Carbon Monoxid on Choroid Plexus and Meninges. S. S. Siengalewicz, Vilna.—p. 289.
Passage of Trypan Blue from Blood Stream into Body Fluids. S. S. Siengalewicz and A. J. Clark, London.—p. 301.
Quantitative Estimation of Reducing Power of Normal and Cancer Tissue. C. Voegtlin, J. M. Johnson and H. A. Dyer, Washington, D. C.—p. 305.

Barbital Narcosis.—During the first few hours of barbital narcosis in pigeons and in cats a lowering of the blood sugar level was observed by Ellis and Barlow. The blood sugar returned slowly to normal by the end of the forty-fourth hour. The coagulation time of the blood was shortened during the first few hours of barbital narcosis, and returned to normal between the twentieth and forty-fourth hours. In general, the curves of average coagulation time and blood sugar varied in the same direction.

Kansas Medical Society Journal, Topeka

24: 315-346 (Nov.) 1924

Pneumonia: Its Management and Treatment. O. D. Sharpe, Neodesha. —p. 315.
Minor Eye Injuries. J. F. Gsell, Wichita.—p. 317.

Dysthyreidism Factor in Secondary Anemia. W. A. Baker, Kansas City, Mo.—p. 321.
Nephritis; Diagnosis. J. L. Calene, Wellington.—p. 323.
Diagnosis and Treatment of Earache. L. B. Spake, Kansas City, Kan. —p. 328.
Modification of Milk for Infant Feeding. H. W. Davis, Plains.—p. 331.

Laryngoscope, St. Louis

34: 753-848 (Oct.) 1924

Potpourri. R. C. Lynch, New Orleans.—p. 753.
Foreign Bodies in Air Passages and Esophagus. Review of Literature. E. J. Patterson, Pittsburgh.—p. 758.
Foreign Bodies in Air and Food Passages; Fifty Cases. L. H. Clerf, Philadelphia.—p. 784.
Bilateral Peanut Kernel in Bronchi. H. B. Orton, Newark, N. J.—p. 811.
Perforation of Esophagus by Foreign Body (Bone). S. Iglauer and J. L. Ranschoff, Cincinnati.—p. 821.
Experience in Medical Legislation. M. Taylor, Jacksonville, Fla.—p. 826.
Mediastinum Inflammation: Occasional Complications of Foreign Bodies in Esophagus. E. McGinnis, Chicago.—p. 831.
Bronchoscopic Failures Which Are Successes. J. W. Jervey, Greenville, S. C.—p. 835.
Chronic Pseudomembranous Laryngitis. R. McKinney, Memphis, Tenn. —p. 839.
Spasmodic Stricture of Esophagus in a Thirteen Months Old Baby. R. McKinney, Memphis, Tenn.—p. 840.

Michigan State Medical Society Journal, Grand Rapids

22: 453-502 (Nov.) 1924

Management of Surgical Cases: Importance of Follow-Up Plan. H. J. Vanden Berg, Grand Rapids.—p. 453.
Prevention of Communicable Diseases Among School Children. R. C. Mahaney, Owosso.—p. 454.
Diagnosis and Treatment of Digestive Diseases. B. C. Lockwood, Detroit.—p. 458.
General Infections by Bacteria. E. Libman, New York.—p. 462.
Hematogenous Staphylococcus Infection of Various Organs Arising from Foci in Skin. D. B. Phemister, Chicago.—p. 466.
Factors in Surgery to Reduce Morbidity and Mortality. C. D. Brooks, Detroit.—p. 471.

Minnesota Medicine, St. Paul

7: 699-752 (Nov.) 1924

*Ketogenic Diet in Treatment of Epilepsy. M. G. Peterman, Rochester, Minn.—p. 708.
Reminiscences of Thirty Years Ago. P. G. Cowing, Evansville, Minn. —p. 711.
Use of Full Thickness Skin Grafts. G. B. New and F. A. Figi, Rochester, Minn.—p. 714.
*Rational and Simple Method of Feeding Children During First Two Years of Life. C. A. Stewart and K. S. Platou, Minneapolis.—p. 717.
History and Present Status of Nonsurgical Treatment of Hemorrhoids. W. A. Fansler, Minneapolis.—p. 720.
Indications for Surgery in Duodenal Ulcer. V. S. Cabot, Minneapolis. —p. 723.
*Choice of Method in Blood Transfusion. D. K. Bacon, St. Paul.—p. 725.
Postoperative Management Following Gastric Operations. T. O. Young, Duluth and L. H. Fowler, Minneapolis.—p. 730.
Preoperative and Postoperative Care of Surgical Patients. A. E. Sohmer, Mankato, Minn.—p. 737.

Ketogenic Diet in Epilepsy.—The results of treatment with the ketogenic diet in twenty cases of epilesy, nine of petit mal, six of grand mal, and five of grand and petit mal, are given by Peterman. Three of the cases are omitted from discussion, because the convulsions are better explained on an organic basis. The remaining seventeen patients are now on the diet, and acetone and diacetic acid are evident in the urine. These seventeen patients are entirely free from epileptic convulsions. The most favorable results have occurred in cases of petit mal.

Method of Feeding Children.—Stewart and Platou begin feeding farina at 6 months, vegetables at 7 months, cereals at 8 months, weaned at 10 months, stewed fruits and meat at 12 months and eggs at from 22 to 24 months.

Blood Transfusion.—Bacon advocates that the sodium citrate method, which carries with it heavy liabilities, should be discarded in so far as possible. Transfusion as an aid to surgical measures, where more than one transfusion is rarely necesary, can best be done by the paraffin tube method. In conditions requiring repeated transfusions, namely the anemias and other medical conditions, the Unger method is preferable to all others.

Missouri State Medical Association Journal, St. Louis

21: 363-403 (Nov.) 1924

*Influence that Etiology of Pneumonias Should Have on Their Treatment. D. G. Stine, Columbia.—p. 363.
Treatment of Cardiovascular Syphilis. P. F. Stookey, Kansas City.—p. 370.
*Parenteral Infection as Factor in Production of Autonomic Imbalance in Infants and Children. P. J. White, St. Louis.—p. 372.
Rectal Palpation in Gynecology and Obstetrics. W. Kerwin, St. Louis. —p. 379.
Vestibular Tests in Relation to Internal Medicine. H. W. Lyman, St. Louis.—p. 381.
Physiologic Amputations. T. G. Orr, Kansas City.—p. 383.

Use of Camphor in Pneumonia.—Stine's observations on camphor showed that it is not a heart stimulant, even in doses of 150 grains. These large doses do not change the rate of amplitude of the pulse beat or tone of the heart sound. In doses of 36 grains and over it is a marked stimulant to a depressed vasomotor apparatus as checked by blood pressure readings and clinical improvement. It increases the output of urine and stimulates markedly sweat production. The human body is tolerant of enormous doses of camphor. Seventy-six patients entering the hospital with evidence of toxic shock received an initial dose of 144 grains of camphor without any deleterous results. An example of the tolerance of camphor is that of a frail girl with an extensive postinfluenzal pneumonia of both lungs who received 756 grains of camphor a week for two weeks with markedly beneficial results. Stine gives the average patient a dosage of 108 grains of camphor during the pneumonia until the temperature is normal. The results noted have been the prompt disappearance of the evidence of toxemia, i. e., dyspnea, restlessness, delirium, and the marked comfort of the patient. Of course, the use of camphor in well established pneumonia, where the toxic damage is already done and consolidation is well advanced, will be disappointing. The results of this treatment have kept Stine's mortality in postinfluenzal pneumonias to 3.4 per cent. of more than 500 cases and have kept the mortality of lobar pneumonias well below 2 per cent.

Parenteral Infection and Autonomic Imbalance in Children.—White endeavors to explain the gastro-intestinal and other apparently unrelated disturbances which may accompany and even mask certain foci of infection in infants and children. The principal manifestations of autonomic imbalance in infants and children are abdominal discomfort, vomiting and diarrhea. Parenteral infection, most commonly found in the upper respiratory tract, may often result in this condition. This is due to the interrelation of different parts of the autonomic system, and to the readiness with which symptoms in one part may produce symptoms in other parts. Treatment consists in (*a*) local treatment of the focus of infection; (*b*) rest; (*c*) large doses of atropin in cases of chronic infection.

U. S. Naval Medical Bulletin, Washington, D. C.

21: 615-740 (Nov.) 1924

Mycosis of Hands and Feet. C. S. Butler, J. E. Houghton and G. F. Cooper.—p. 615.
Schistosomiasis Japonica in U. S. Navy. H. E. Meleney.—p. 630.
Arterial Hypertension. W. D. Owens.—p. 637.
Diagnosis of Colon Diseases. H. L. Brockmann.—p. 644.
Influence of Climate in Treatment of Tuberculosis. J. D. Blackwood, Jr.—p. 652.
Pylorospasm on Division of Pyloric Ring. L. H. Williams.—p. 659.
Classification of Arthritides: Case of Hypertrophic Arthritis. C. J. Stuart.—p. 660.
Carcinoma of Pancreas: Case. H. L. Pugh.—p. 664.

West Virginia Medical Journal, Huntington

19: 561-616 (Nov.) 1924

Pathologic Endometrium. F. C. Hodges, Huntington.—p. 561.
Endometrium from Clinical Standpoint. W. N. Rowley, Huntington. —p. 565.
Problems of Selecting Student Nurses. E. Koch, Huntington.—p. 570.
Personal Reminiscences of Founder of Microbiology. W. S. MaGill, Elkins, W. Va.—p. 571.
Pyelitis. T. J. McBee, Morgantown, W. Va.—p. 576.
Case of Enlarged Liver. C. L. Holland, Fairmont, W. Va.—p. 580.

Wisconsin Medical Journal, Milwaukee

23: 278-338 (Nov.) 1924

Thoracic Surgery. C. A. Hedblom, Madison.—p. 278.
Indications and Contraindications for Use of Combined Spleen and Marrow in Anemic Conditions. J. S. Evans and C. D. Leake, Madison.—p. 282.
Spleen Extract and Bone Marrow in Treatment of Secondary Anemia. D. Fisher and M. W. Snell, Milwaukee.—p. 286.
Spleen Extract and Bone Marrow in Treatment of Tuberculosis. R. W. Dunham, Oak Forest, Ill.—p. 292.
Diagnosis of Very Early Pernicious Anemia. T. L. Szlapka, Milwaukee.—p. 298.
Intraspinal Treatment of Neurosyphilis. A. B. Magnus, Wauwatosa. —p. 302.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Medical Psychology, London

4: 179-271 (Nov. 17) 1924

Study in Dissociation of Personality. A. G. Ihin.—p. 179.
Physiology of Tremor in Relation to Neuroses. R. G. Gordon.—p. 224.
Response of Epileptic Children to Mental and Educational Tests. J. T. Fox.—p. 235.
Child Study. M. N. Searl.—p. 249.

British Medical Journal, London

885-932 (Nov. 15) 1924

*Acclimatization to High Altitudes. J. S. Haldane.—p. 885.
Richard Owen as Conservator. A. Keith.—p. 890.
Xanthoma and Xanthosis. M. J. Stewart.—p. 893.
*Improved Methods of Obtaining Cultures from Colon: A "Sigmoid Leech." C. Dukes.—p. 896.
Spread and Incidence of Protozoal Infections in Population of This Country.—A. M. Smith.—p. 897.
*Extragenital Chancre. G. A. M. Hall.—p. 899.
*Postoperative Thirst. O. Carlyle.—p. 899.

Acclimatization to High Altitudes.—Regarding the phenomena of acclimatization to a low atmospheric pressure, as a whole, Haldane says, it is seen at once that when acclimatization is complete the organism is still in a physiologically different state from what it was before exposure to the low pressure. The breathing is greatly increased; the concentration of the blood in hemoglobin and red corpuscles is also increased, as well as the blood volume; the blood plasma is altered in composition; the blood-forming bone marrow is increased. All these changes, and probably many more which are not yet discovered, center, quite evidently, round what may metaphorically be designed as an attempt to keep the oxygen pressure, and simultaneously the hydrogen-ion concentration, about and within the living tissues constant. Although from its very nature the process of acclimatization cannot be complete theoretically, yet it has the unmistakable effect of keeping the oxygen pressure within the body approximately constant without more than slight disturbance of other important factors in environment.

Direct Cultures from Colon.—Dukes has devised a method by means of which it is possible to make cultures directly from the inflamed area and not from the feces. He makes use of the suction principle and terms his apparatus a "suction leech." For the cultivation of the bacteria he uses serum agar, blood agar, or ascitic fluid agar.

Chancre of Conjunctiva.—In the case cited by Hall a hard mass occupied the bulbar conjunctiva below and to the inner side of the cornea. This mass had a very definitely cartilaginous feel, was well circumscribed, and was slightly concave forward. It was ulcerated in the center, leaving a raw area with a thin serous crust, which on removal produced a free serous discharge and a few fine points of hemorrhage. Smears showed *Spirochaeta pallida* in very large numbers. The husband and the father of the patient were seen at the same time, and no signs of a recent or old syphilitic infection could be found. Active syphilis in other members of the family was denied.

Prevention of Postoperative Thirst.—To prevent postoperative thirst in abdominal operations, Carlyle pours into the peritoneal cavity, just prior to closure of the wound, a quantity of warm physiologic sodium chlorid solution. A pint of fluid may safely be administered by this route. There is rapid absorption and no untoward effect. This treatment is not recommended in septic cases.

Journal of Cancer, Dublin

185-246 (Oct.) 1924

*Some Problems in Cancer Research. Oberndorfer.—p. 185.
*Voluntary Notification of Cancer. J. Brown.—p. 196.
Position of Deep Roentgen-Ray Therapy in Gynecology. W. Pilger.—p. 200.
Biology of Cancer. H. Reinheimer.—p. 207.
Is Cancer Infectious? E. H. Shaw.—p. 228.
Infection Theory of Cancer. J. Young.—p. 230.

Problems in Cancer Research.—Oberndorfer emphasizes the fact that the experimental transplantation of isolated stroma cells has not yet been effected. It is possible though not probable that these might cause epithelial malignant growths. If this could be proved, it would have to be assumed that epithelial growth in cancer is secondary, and disturbances in the metabolism of connective tissue are primary. That is, that epithelial growths must be considered as a reaction of the body to growth stimulating influences arising in the connective tissue, just as the tubercle is not the disease, but is the protective reaction of the body to the products of the tubercle bacillus.

Notification of Cancer.—Brown submits a notification form for cancer and suggestions. There is very great dread of cancer. Cancerphobia must be allayed. This can be done by obtaining the necessary facts in relation to the incidence of the disease, the social and other factors that predispose to cancer by notification of all suspicious cases in the early stage. It is the duty of the minister of health through the public health authorities to secure this. It is done in regard to the infectious diseases. It can be done in cancer cases by voluntary notification. Every sanitary authority can indicate the social status in which cancer is most prevalent. Already there is evidence that in many points it is opposite to tuberculosis—low rent, poverty, etc.; in cancer—high rental, luxury, overnutrition, etc.

Journal of State Medicine, London

32: 451-500 (Oct.) 1924

Medical Service of Territorial Army. C. P. Oliver.—p. 451.
Etiology of Phlebotomus Fever. H. E. Whittingham.—p. 461.
Cockroach as Possible Disseminator of Disease: Methods of Eradication. E. St. G. S. Goodwin.—p. 470.

Sei-I-Kwai Medical Journal, Tokyo, Japan

43: 1-14 (Oct.) 1924

Sulphur Metabolism of Yeast. H. Sugata.—p. 1.
Mites (Acarina) Found in Urine of Japanese. T. Kimura, H. Suda and K. Kishida.—p. 12.
Blood Features in Albino Rats Bearing Transplantable Carcinoma. K. Oba.—p. 13.

Annales d'Anatomie Pathologique Méd.-Chir., Paris

1: 489-584 (Sept.) 1924

*Aberrant Pulmonary Lobe. Rouvillois and Delater.—p. 489.
Malignant Embryoma in Testis of Young Man. G. Roussy and R. Huguenin.—p. 505.
*Peptic Ulcer in Meckel's Diverticulum. Y. Humbert.—p. 521.
Tumors from Endometrial Implants. C. Oberling.—p. 541.

Aberrant Lobe of Lung Tissue.—Rouvillois and Delater describe a case of this kind in a young man. The lung tissue formed a cyst, due, perhaps, to a slow tuberculous process. It was not connected with adjacent organs. The accessory lobe seemed to have originated from an esophageal diverticulum, in an early stage of embryonic development. The danger with these tumors is the possibility of malignant degeneration. In conclusion they classify three types of tumors originating from the superior segment of the embryonic intestine.

Peptic Ulcer in Meckel's Diverticulum.—Humbert adds a seventh case of peptic ulcer in Meckel's diverticulum, to the six on record. The disturbance occurred in an infant, 11 months. Necropsy revealed an ulcer in the diverticulum, which had perforated into the peritoneum, causing a generalized peritonitis. Histologic examination showed both gastric and intestinal mucosa in the diverticulum. The ulcer was at the point of junction. Gastric mucosa has been invariably present in the diverticulum in these ulcer cases. Three photomicrograms are given.

Bulletin de l'Académie de Médecine, Paris

92: 1101-1136 (Nov. 11) 1924

Hyperglycemia Test of Action of Vichy Treatment. Labbé et al.—p. 1103.
*Experimental Diabetes. Camus et al.—p. 1107.
Identity of Oulou Fato with Rabies. Remlinger and Curasson.—p. 1112.
*Preliminary Pneumothorax for Intrathoracic Operations. J. Arce.—p. 1117.
Hydrogen Ion Concentration of Mineral Waters. R. Glénard and Gruzewska.—p. 1119.
Experimental Sterilization of Dressings. A. Lescurre.—p. 1122.
Early Diagnosis of Cancer in Digestive Tract. H. Surmont.—p. 1124.
Statistics on Cancer in Digestive Tract. H. Surmont.—p. 1128.

Experimental Diabetes.—Camus, Gournay and Le Grand produced experimental diabetes by introducing a capillary tube

filled with fatty acids into the pituitary region in rabbits. In the ten positive cases out of eighteen complete experiments, the lesion was localized in the tuber cinereum. In the negative cases, the lesion was always found at some point near or remote from the tuber. Serial sections of the tuber revealed that the paraventricular nucleus was constantly, and the nucleus of the tuber was frequently affected. The close contact of these centers in the tuber suggests that one nucleus may produce polyuria, the other, glycosuria. It was evident from their research that a lesion of the tuber causes a more durable and a graver diabetes than that from the Claude Bernard sugar puncture.

Preliminary Pneumothorax in Operations on Chest Cavity.—Trials in thirty cases convinced Arce that any thoracotomy should be preceded by an artificial pneumothorax, except in cases with pleural adhesions. Then manipulations with the lung, heart, diaphragm, and even puncture of the aorta, he says, do not cause any discomfort to the patient under local anesthesia. The purpose of the preliminary pneumothorax is to prepare the pleura for the contact of air during and after the surgical intervention.

Bulletins de la Société Médicale des Hôpitaux, Paris

48: 1517-1572 (Nov. 14) 1924

*Gold Test in General Paralysis. Sicard and Haguenau.—p. 1517.
*Xanthoma in Syphilitic with Diabetes. Rathery and Gournay.—p. 1531.
Opthalmoplegia in Syphilis. L. Babonneix and M. Lévy.—p. 1535.
Comparative Study of Cerebrospinal Fluid in Treated and Untreated Cases of General Paralysis. R. Targowla.—p. 1537.
*Cholesteremia in Diabetes. M. Labbé and J. Heitz.—p. 1546.
Action of Insulin on Cholesteremia in Diabetes. M. Labbé and E. Tamalet.—p. 1554.
*Coma from Liver Insufficiency in Diabetes. M. Labbé.—p. 1560.
*Simplified Acidimeter for the Urine. M. P. Weil.—p. 1563.

Value of Colloidal Gold Test in General Paralysis.—Sicard and Haguenau believe that the more favorable American and Austrian statistics in regard to successful treatment of general paralysis may be explained by inclusion of certain cases of cerebral syphilis among those treated for general paralysis. They have simplified the colloidal gold test, and declare that cases suspected of general paralysis, with a positive reaction in the cerebrospinal fluid to this test, are incurable. Recovery may occur with a negative response to their modified test.

Xanthoma in Syphilis Complicated with Diabetes.—Rathery and Gournay observed this case in a man, aged 50. Under treatment for syphilis the xanthoma disappeared, while carbohydrate assimilation increased. The xanthoma reappeared whenever unsuitable diet overstepped the tolerance limit. The connection between carbohydrate assimilation and fat metabolism may explain the effect on the xanthoma, which is not of syphilitic origin.

Dosage of Cholesterol in Diabetes.—Labbé and Heitz ascribe the higher figures of cholesterol in diabetes recorded by Joslin, Bloor and Gray to the more accurate American method of dosage. While in the French (Grigaut's) method, a part of the cholesterol escapes titration in the serum, in Bloor's method, which is somewhat slower, the titration is more complete.

Coma from Liver Insufficiency in Diabetes.—The necropsy findings confirmed in Labbé's case the diagnosis of coma due to liver insufficiency in an alcoholic diabetic. The exact etiology of the coma should be ascertained, as the treatment differs from that in true diabetic coma.

Estimation of Hydrogen Ion Concentration in the Urine.—Weil describes an apparatus for measurement of the p_H of the urine. The extremely simple and rapid technic will, he hopes, popularize the routine estimation of ion acidity in the urine.

Comptes Rendus de la Société de Biologie, Paris

91: 1059-1113 (Nov. 21) 1924. Partial Index

Grafting of Monkey Testes in Man. H. Cristiani.—p. 1061.
Encephalitis Virus in Cerebrospinal Fluid. S. Nicolau and P. Poincloux.—p. 1063.
Electrocardiogram After Cervical Sympathectomy. F. C. Arrillaga.—p. 1065.
*Experimental Tuberculous Cavities in Rabbits. A. Philibert and F. Cordey.—p. 1072.
*Photochemical Substances in Retina. François and Piéron.—p. 1073.
*Ovary Graft in Adult Cock. Pézard et al.—p. 1075.
Fly Ova in Relation to Intestinal Myiasis. F. Dessil.—p. 1079.
*Platelets and Leukocytes in Rabbit Blood. Backman et al.—p. 1089.
*Action of Saponin on Blood in Vitro. A. Beskow.—p. 1092.
*Means to Influence Action of Acetylcholin. H. Rydin.—p. 1098.
*A Year-Old Culture of Sarcoma Cells. A. Fischer.—p. 1105.
Action of Insulin and Muscle Tissue on Glucose in Vitro. C. Lundsgaard and S. A. Holboell.—p. 1108.
Method for Inducing Chronic Nephritis in Rabbits. J. Jessen.—p. 1111.

Tuberculous Cavities in Rabbits.—Philibert and Cordey infected the lung by intratracheal injection of 5 cg. of tubercle bacilli. They injected up to 10 cg. a month or two later, and with this large dose the lungs presented in time cheesy nodules, degenerating into large cavities. The infection and reinfection were not followed by allergy, nor by early death of the animal.

Photochemical Substances in the Retina.—François and Piéron's observations prove that, contrary to the opinion in vogue, the rods and the cones of the retina have different photochemical substances, and that the substance of the cones is not identical with the visual purple. This may explain the different sensitivity to light waves.

Ovarian Graft in Cock.—Pézard, Sand and Caridroit conclude from their experiment that an infantile ovary may survive, develop and preserve its endocrine function when implanted in an adult castrated cock. The body tissues of hens and cocks manifest a marked receptivity for heterologous gonads.

Content of Platelets and Leukocytes in Rabbit Blood.—Backman and his co-workers' 127 examinations of blood from sixty-seven different animals showed that the higher the content of platelets, the larger the number of leukocytes.

Action of Saponin on Platelets and Leukocytes in Blood in Vitro.—The strong concentration of saponin, used by Beskow, seemed to dissolve the platelets in rabbit blood in vitro. This concentration did not affect the leukocyte count, although their constitution seemed to be somewhat modified. This indicates a physicochemical distinction between the platelets and the leukocytes.

Modification of Action of Acetylcholin.—Chloroform, ether and chloral in very weak doses increased in Rydin's experiments, the inhibiting action of acetylcholin on the frog heart. A large dose of these narcotics reduced or arrested the action on the vagus.

A Year Old Culture of Sarcoma Cells in Vitro.—Fischer relates that with his method (described in THE JOURNAL, May 3, 1924, p. 1488) he has succeeded in cultivating a single sarcoma cell outside the organism for a year. He agrees with Carrel that the ameboid cells are the ones responsible for the malignancy.

Néoplasmes, Paris

3: 5-48 (Feb.) 1924

Culture in Vitro of Tumors Placed in Contact with Organs of Internal Secretion. J. Carra.—p. 5.
*Flocculation Test for Cancer. A. H. Roffo.—p. 18.
Infectious Chicken Sarcoma. M. F. Pentimalli.—p. 28.
Reactions of the Organism in Cancer. Rubens-Duval.—p. 31.

Flocculation Test for Cancer.—Roffo's article was summarized in these columns, July 12, 1924, p. 158.

3: 49-96 (April) 1924

Specific Gravity of the Blood in Cancer. A. Robin.—p. 49.
Research on the Destruction of Neoplastic Cells. A. H. and A. Roffo.—p. 54.
*Biologic Research in Cancer. B. Sokoloff.—p. 62.
Prickle-Cell Cancer of Oral Cavity. F. Clair.—p. 71.

Biologic Research on the Cancer Problem.—Sokoloff summarizes the results of his ten-year study and appends the list of his thirty-four works on cancer. The practical deductions are the necessity of building up the resistance of the diseased organism by increasing the activity of the lymphatic system and suppressing all factors capable of inducing abnormal cell activity, combating irritants, hyperacidity and abnormal internal secretions.

3: 97-144 (June) 1924

Deep Radiotherapy for Uterine Fibroma. Declairfayt.—p. 97.
Chemotherapy of Cancer. J. Thomas.—p. 108.
Radiotherapy in Skin and Mouth Cancers. F. Clair.—p. 126.

B: 143-192 (Aug.) 1924

*Free Hydrochloric Acid in the Gastric Juice in Cancer. A. Robin.—p. 145.
Surgical Treatment in Cancer of Large Intestine Without Obstruction. P. Delbet.—p. 155.

Free Hydrochloric Acid in the Gastric Juice in Cancer.—Robin believes that the absence of free hydrochloric acid is not a symptom of cancer. More or less free hydrochloric acid is encountered in 10 to 20 per cent. of cancer cases, and is absent in a number of other diseases. Its absence consequently is only a corroborating sign. The achlorhydria may be traceable to the degree and extent of the chronic gastritis with cancers in or near the stomach; with other localizations of the cancer, to the anemia and cachexia, which also decrease or suppress hydrochloric acid secretion in other morbid states; and, in cases where the hydrochloric acid appears to be secreted normally or in excess, to neutralization by the alkaline compounds from the cancer ulcerations or by the products of the cleavage of albuminoids by ferments from the tumor.

Paris Médical

377-392 (Nov. 8) 1924

*Chromoscopic Test of Gastric Secretion. Carnot and Gaehlinger.—p. 377.
Nitrobenzol Poisoning: Case in Child. Nobécourt and Pichon.—p. 380.
Massive Doses of Antitoxin in Tetanus. Jagnov.—p. 388.

Chromoscopic Test for Gastric Function.—Carnot and Gaehlinger's researches on twenty-seven patients proved that only two of several dyes, injected intramuscularly, namely, methylene blue and neutral red, were eliminated by the stomach. After a dose of 4 c.c. of a 1 per cent. freshly prepared solution, the dye began to show in the normal stomach in fourteen or fifteen minutes. The elimination was accelerated in hyperchlorhydria, lowered in hypochlorhydria, and absent in anachlorhydria. In a case of impermeability of the kidneys, the passage of neutral red by the stomach occurred after six or seven minutes, although there was hypochlorhydria. He adds that the intramuscular injection of neutral red is very painful.

421-436 (Nov. 22) 1924

Clinical Study of Cervical Ribs. A. Léri and N. Péron.—p. 426.
*Hyperglycemia Without Glycosuria. P. Oury and R. M. Técon.—p. 432.

Clinical Picture of Diabetes in Hyperglycemia Without Glycosuria.—Oury and Técon observed the characteristic skin and nervous complications of diabetes in a patient, aged 60, with hyperglycemia, but almost no glycosuria. This case, they say, seems to confirm the exclusive rôle of hyperglycemia in the clinical manifestations of diabetes. An intoxication of a still unknown nature may occur from hyperglycemia. The arterial tension differed in the four limbs. This could be explained only by a local hypertension, caused by local changes in the vessels and in their vasomotor innervation.

Presse Médicale, Paris

32: 925-936 (Nov. 22) 1924

*Resection for Cecal Stasis. E. Desmarest and O. Mercier.—p. 925.
Arsenic Treatment in Amebiasis. C. Garin and P. Lépine.—p. 927.
Chaulmoogrates and Morrhuates in Treatment of Leprosy and Tuberculosis. J. Rouillard.—p. 929.

Resection of Cecum and Ascending Colon for Inveterate Cecal Stasis.—Desmarest and Mercier succeeded in thirteen cases out of twenty with this operation. They emphasize that not only the immediate operative results were as good as in colopexy, ileosigmoidostomy or ileocolostomy, but also the late results excelled. There has been no recurrence of symptoms during the two to six years since.

32: 937-943 (Nov. 26) 1924

Fight Against Cancer in France. J. Bergonié and G. Roussy.—p. 937.
*Serodiagnosis of Syphilis. M. Rubinstein.—p. 939.

Comparative Value of Methods in Serodiagnosis of Syphilis.—Rubinstein states that, with his modified technic, the Jacobsthal test is as specific as the Wassermann test, and is still more sensitive. The Hecht test is a valuable adjuvant to other tests of so-called indirect flocculation (where fixation of complement, causing an inhibition of hemolysis, serves as indication of the occurring flocculation). It is however not alone sufficient for diagnosis. The tests of direct (visible) flocculation, such as the Meinicke or Sachs-Georgi tests, cannot substitute the Wassermann reaction.

Schweizerische medizinische Wochenschrift, Basel

54: 1049-1072 (Nov. 13) 1924

*Readaptation After Crippling Trauma. C. Julliard.—p. 1050.
*Idem in the Insured and Noninsured. J. Heller.—p. 1053.
Rehabilitation Schools. F. Zollinger.—p. 1055.
*Regeneration on Injured Elbow. E. Baumann.—p. 1057.

Readaptation After Crippling Trauma.—Julliard excludes objective ameliorations from the definition of adjustment. Only the functional adaptation to new conditions should be understood by *accoutumance*. It is surprisingly good and rapid in children, and in persons who are not insured. It is difficult to predict the degree of adjusting. A definitely fixed indemnity is the only way to prevent the insurance neurosis.

Adjustment in the Insured and Noninsured.—Heller pleads for revisions of the condition of the injured, because it is impossible to foretell the degree of their adjustment. He believes that simulation and aggravation are only exceptional.

Regeneration on Injured Elbow.—Baumann observed regeneration of the external condyle of the humerus in all of his five patients requiring amputation after injuries. The regeneration was not inhibited by the intra-articular seat of the fracture. A distinct increase of the speed of development of the bone on the injured side was noted in children.

Deutsche medizinische Wochenschrift, Berlin

50: 1569-1602 (Nov. 14) 1924

*Dysentery Toxin. H. Lüdke.—p. 1569.
Wassermann's Tuberculosis Reaction. H. Förtig.—p. 1570.
Culture of the Gonococcus. R. Strempel.—p. 1574.
*Local Hyperemia of Reflex Origin. Rajka and Fürth.—p. 1575.
*Treatment of Membranous Croup. M. Klotz.—p. 1576.
*Quartz Lamp Treatment of Spasmophilia. H. Flesch.—p. 1577.
*Gastroscopic Sign of Duodenal Ulcer. W. Sternberg.—p. 1579.
*Twins and Nevi. Leven.—p. 1580.
*Predicting the Sex. O. Schöner.—p. 1581.
*Biologic Leukocyte Curve. V. Schilling.—p. 1583.
*Roentgen Treatment of Jaundice. G. Szemső.—p. 1584.
The Wassermann Reaction. Bohne.—p. 1584.
Reinfection with Syphilis After Linser's Treatment. Sirota.—p. 1585.
Device for Obtaining Secretion. E. Guttmann.—p. 1585.
Protein Treatment. A. Buzello.—p. 1585.
*Medical Education in Russia. N. Semaschko.—p. 1587.
Contracts with Publishers. J. Schwalbe.—p. 1588. Cont'n.
*Pluriglandular Origin of Diabetes. E. J. Kraus.—p. 1600. Conc'n.

Dysentery Toxin.—Lüdke obtained in suitable mediums with some strains of Shiga-Kruse bacilli toxins which killed rabbits in doses of 0.05-0.1 c.c. of the bouillon filtrate. An alcohol-soluble hemolysin may be separated from a neurotoxic fraction.

Local Hyperemia of Reflex Origin.—Rajka and Fürth found an increased local reflex hyperemia on the paralyzed side of hemiplegic patients. The edematous parts in a patient with myxedema reacted less. No reaction was observed with completely anesthetic skin.

Treatment of Membranous Croup.—Klotz agrees with Schlossmann's extreme conservative views for children under 2 years of age. He never saw recovery in tracheotomized infants under 1 year, and rarely in the second year. The process affects usually the bronchi. In older children, he recommends intubation or tracheotomy. Even the fallacious transitory improvement observed sometimes is considered by him as reason to perform the operation. Nevertheless he admits that too many tracheotomies are made.

Quartz Lamp Treatment of Spasmophilia.—Flesch had only good results with quartz lamp irradiation of spasmophilic infants. He administered the treatment among others to eleven infants with attacks of convulsions. The convulsions were arrested in all of them.

Gastroscopic Sign of Duodenal Ulcer.—Sternberg observed a bloody or coffee colored secretion in the pylorus in some cases of ulcer of the duodenum.

Twins and Nevi.—Leven demonstrates by the slight differences in the papillary lines in univitelline twins that there is an extreme similarity, but not identity. Consequently, the differences in the nevi in such twins do not disprove their hereditary origin.

Predicting the Sex.—Schöner predicts the sex of the fetus according to the side of the tender corpus luteum, and the

number of menstruations which had elapsed between the pregnancies. His errors amount to 36 per cent.

Biologic Leukocyte Curve.—Schilling pleads for the use of serial differential counts with consideration of quantitative changes of neutrophils. The supposedly exact absolute counts are not essential.

Roentgen Treatment of Jaundice.—Szemző's patient had jaundice with urobilinuria (no bilirubinuria), normal stools and enlarged liver. He recovered after roentgen treatment for a year. Then he died from a cancer of the liver and a callous ulcer of the duodenum invading the pancreas.

Medical Education in Russia.—Commissary of hygiene Semaschko discusses the organization of the study of medicine in Soviet Russia. He confirms the report that peasant or working-class parentage is required for admission, or is given the preference among the candidates.

Pluriglandular Origin of Diabetes.—Kraus concludes that there are no reasons to assume a pluriglandular origin of diabetes mellitus, although all the organs of sugar metabolism are affected.

Deutsche Zeitschrift für Chirurgie, Leipzig

187: 289-432 (Oct.) 1924

*Perforation Peritonitis. W. Löhr.—p. 289.
*Metastases from Colloid Goiter. F. Klinge.—p. 317.
*Grafting Treatment of Paralysis Agitans. W. Kühl.—p. 328.
Differentiation of True Abdominal Wall Hernia. F. Kaspar.—p. 334.
*Differentiation of Appendicitis and Adnexitis. E. Sattler.—p. 347.
Remote Results of Albee Implant in Spondylitis. C. Mau.—p. 353.
Coxa Valga and Canting of Pelvis in Relation to Luxation of the Hip Joint. R. Sommer.—p. 375.
*Osteochondritis of Sternal End of Clavicle. H. Friedrich.—p. 385.
*The Urochromogen Reaction in Prognosis. M. Geldmacher.—p. 399.
Perforation Peritonitis in Walking Paratyphoid. E. Cornils.—p. 422.

The Prognosis with Perforation of Gastric and Duodenal Ulcers.—Löhr declares that the outcome depends on the intensity of the peritoneal reaction to the perforation—the operative technic is comparatively immaterial. He asserts further that the intensity of the peritoneal reaction depends in turn on the presence of hydrochloric acid in the stomach or duodenum contents escaping into the peritoneum. The hydrochloric acid maintains conditions favoring the normal flora; as soon as the hydrochloric acid disappears, the flora from the large intestine usurps control, and the peritonitis becomes malignant. Bacteriologic study of six cases confirmed this in every respect. In one case, with operation the eighth hour, the exudate showed lactic acid bacilli and streptococci, but the gastric secretion was constantly acid. The patient died the eleventh day from embolism, and not a trace of peritonitis could be discovered. In two other cases—in which the stomach content showed no acid—the colon bacillus was found in the stomach content on repeated examination after the operation, and both patients succumbed. Experiments on guinea-pigs confirmed these findings and justify the assumption that the prognosis depends on whether the harmless small intestine flora or the large intestine flora shall prevail, and this is decided by the gastric chemistry at the moment.

Metastasis-Inducing Goiters.—Klinge relates that attention had never been called to the thyroid in his case although numerous metastases in sternum and elsewhere had developed in the course of four years. The thyroid presented evidences only of a simple adenoma until a minute focus of malignant structure was finally discovered.

Paralysis Agitans and Parathyroid Deficiency.—The improvement in four of six cases treated with parathyroid implants from calf or horse, and the predisposition to paralysis agitans noted in a few families, justify further research in this line. Kühl remarks. He adds that the domain of the internal secretions belongs to surgical criticism and to the impetus of surgical thinking. Even diabetes may yet prove amenable to surgery.

Test to Differentiate Appendicitis and Adnexitis.—Sattler has the patient sit erect in bed, and tells her to raise the extended right leg, aiding her to do this, while an assistant presses against the back to keep the trunk perpendicular. By this means the cecum is compressed between the psoas and the abdominal wall, and a sharp pain is felt in case of appendicitis at the junction of the right and middle thirds of the line uniting the iliac spines. With adnexitis, the painful point is a little lower and farther toward the right. In 150 cases this method of examination has always proved instructive and reliable.

Aseptic Necrosis of Sternal End of Clavicle.—Friedrich describes two cases in men, the clinical picture and course resembling those of the Legg-Perthes deforming osteochondritis of the hip joint. He resected the end of the clavicle, substituting it or not with a segment of rib. The microscope apparently excluded primary inflammation, rickets, tuberculosis, tumor or arthritis deformans, the findings suggesting, rather, a local malacia.

The Weiss Urochromogen Reaction in Surgical Tuberculosis.—Geldmacher applied the potassium permanganate test to the urine of fifty patients (one, two or three drops of the 0.01 per cent. solution to 15 c.c. of urine). It was always positive in the cases that terminated fatally. When the reaction persists positive, a grave form of the tuberculosis must be assumed. Operations on the tuberculous process should be deferred until the test is persistently negative.

Ugeskrift for Læger, Copenhagen

86: 591-606 (Aug. 7) 1924

*Action of Insulin on Glucose. Lundsgaard and Holbøll.—p. 591.

Action of Insulin on Glucose in the Test Tube.—Lundsgaard and Holbøll relate that solutions of glucose can be purified by passing the fluid through a collodion membrane. They were unable to change the polarization of light in the glucose solution by addition of insulin and blood, but this could be realized with addition of insulin with muscle tissue. Beta glucose could be changed to gamma glucose by this means.

86: 607-622 (Aug. 14) 1924

Experimental Hermaphrodism. Pézard, Sand and Caridroit.—p. 607.
Bessier's Prurigo with Asthma. K. Haagde.—p. 609.
Research on Schick Reaction in Children. P. Hertz.—p. 612.
Restriction of Visual Field in the Pregnant. E. Holm.—p. 615.
Acute Anemia from Acute Lead Poisoning. P. Ulrik.—p. 616.

86: 687-710 (Sept. 18) 1924

*Forms of Tuberculous Nephritis. C. Holten.—p. 687. Cont'd.
Action of Insulin on Glucose Solutions. C. Lundsgaard and Holbøll.—p. 693.
*Dissolving Bladder Calculi. J. Meyer.—p. 694.
Case of Torsion of the Testis. N. F. Gregersen.—p. 694.

Forms of Tuberculous Nephritis.—Holten relates that tuberculosis of the kidneys was observed in 3.4 per cent. of the 3,619 inmates of a Danish sanatorium for lung disease and in 1.6 per cent. of 1,923 in another institution. In his own experience in the tuberculosis ward of a city hospital, he encountered forty-five cases. Contracted kidney was found in one of this group; hemorrhagic nephritis was diagnosed in twelve (with necropsy in two); in three cases with necropsy there was hemorrhagic nephritis with amyloidosis, and in twenty-three cases amyloidosis alone; amyloidosis with renal tuberculosis in four, and transient albuminuria in two. He did not encounter any instance of parenchymatous nephritis. Amyloidosis was manifest in all of the seventeen cases that came to necropsy and is probably present in all except the few that have apparently recovered. His findings indicate that the kidney affection cannot be ascribed to toxic action or to mixed infection. The tubercle bacillus itself seems to be responsible.

Dissolving of Bladder Calculi.—Kindt has recently published a case in which systematic rinsing out of the renal pelvis reduced the size of a kidney calculus, and finally dislodged it, until it passed down to the prostate. The bladder was then repeatedly rinsed out and the stone was finally expelled. Meyer here reports that he succeeded in dissolving two calculi in the bladder, as large as hazel nuts, by continuous irrigation of the bladder with a weak solution of hydrochloric acid. The dissolving proceeded without the slightest mishap, and was complete in nine days, under roentgen-ray control and cystoscopy. He was equally successful in a second case. The method is now in use in Rovsing's service. He does not give further details of the technic.

JOURNALS ABSTRACTED IN THE CURRENT MEDICAL LITERATURE DEPARTMENT, JULY-DECEMBER, 1924

The following journals have been reviewed and abstracts of important articles made in the Current Literature Department of THE JOURNAL during the past six months. Any of the journals will be lent by THE JOURNAL to subscribers in the United States and to Fellows of the American Medical Association for a period not exceeding three days. Two journals may be borrowed at a time. No foreign journals are available prior to 1920, nor domestic journals prior to 1923. Requests for periodicals should be addressed to the Library of the American Medical Association and six cents in stamps should be enclosed. This covers the average expense of mailing a journal. Thus most of the journals reviewed are accessible to the general practitioner, no matter where located.

A. M. M. Asociación Médica Mexicana. M. Mexico City.
Acta Chirurgica Scandinavica. Irregular. 20 kronor. Stockholm.
Acta Dermatologica. Irreg. Kyoto, Japan.
Acta Dermato-Venereologica. Irreg. 60 fr. per vol. Stockholm.
Acta Medica Scandinavica. Irregular. $5.50 per volume. Stockholm.
Acta Ophthalmologica. Irreg. $6 per volume. Copenhagen.
Acta Pædiatrica. Irregular. $5 per volume. Uppsala.
Acta Scholae Medicinalis Universitatis Imperialis in Kioto. Irregular. 3.30 yen per issue. Kioto.
American Journal of Anatomy. Bi-m. $7.50 per volume. 36th St. and Woodland Ave., Philadelphia.
American Journal of Diseases of Children. M. $4. American Medical Association, 535 N. Dearborn St., Chicago.
American Journal of Hygiene. Bi-m. $6. Baltimore.
American Journal of the Medical Sciences. M. $6. Lea & Febiger, 706 Sansom St., Philadelphia.
American Journal of Obstetrics and Gynecology. M. $6. C. V. Mosby Co., St. Louis.
American Journal of Ophthalmology. M. $10. Chicago.
American Journal of Physiology. M. $5 per volume. Baltimore.
American Journal of Psychiatry. Q. $5 per volume. Johns Hopkins Press, Baltimore.
American Journal of Public Health. M. $5. 370 Seventh Ave., New York.
American Journal of Roentgenology and Radium Therapy. M. $10. Paul B. Hoeber, 67 E. 59th St., New York.
American Journal of Syphilis. Q. $7. C. V. Mosby Co., St. Louis.
American Journal of Tropical Medicine. Bi-m. $5 per volume. Williams & Wilkins Co., Baltimore.
American Review of Tuberculosis. M. $4 per volume. National Tuberculosis Association, 370 Seventh Ave., New York.
Anales de la Facultad de Medicina, Universidad de Lima. Bi-m. 1.50 soles per issue. Lima, Peru.
Anales de la Facultad de Medicina, Universidad de Montevideo. M. 6 pesos per year. Montevideo.
Anales de la Sociedad Medica de Saltillo. Bi-m. 6 pesos. Mexico.
Anales de la Sociedad Médico-Quirúrgica del Guayas. M., excepting February and March. $6. Guayaquil, Ecuador.
Annales de Dermatologie et de Syphiligraphie. M. 45 francs. Paris.
Annales de l'Institut Pasteur. M. 55 francs. Paris.
Annales des Maladies Vénériennes. M. 52 francs. Paris.
Annales de Médecine. M. 55 francs. Paris.
Annali d'Igiene. M. 60 lire. Rome.
Annali di Nevrologia. Bi-m. 40 francs. Naples.
Annals of Clinical Medicine. M. $6. Williams & Wilkins Co., Baltimore.
Annals of Medical History. Q. $8. Paul B. Hoeber, 67 E. 59th St., New York.
Annals of Otology, Rhinology and Laryngology. Q. $6. 5154 Westminster Place, St. Louis.
Annals of the "Pickett-Thomson" Research Laboratory. Irregular. $6 per issue. London.
Annals of Surgery. M. $10. J. B. Lippincott Co., E. Washington Square, Philadelphia.
Annals of Tropical Medicine and Parasitology. Irregular. £1 2s. 6d per volume. Liverpool.
Archiv für Dermatologie und Syphilis. Irreg. Price varies. Berlin.
Archiv für Gynäkologie. Irregular. Price varies. Berlin.
Archiv für Kinderheilkunde. 21 Swiss francs per vol. Stuttgart.
Archiv für Klinische Chirurgie. Irregular. Price varies. Berlin.
Archiv für Verdauungs-Krankheiten. Irregular. 25 Swiss francs per volume. Berlin.
Archives of Dermatology and Syphilology. M. $8. American Medical Association, 535 N. Dearborn St., Chicago.
Archives Franco-Belges de Chirurgie. M. 60 francs. Brussels.
Archives de l'Institut Pasteur d'Algérie. Q. Alger.
Archives de l'Institut Pasteur de Tunis. Q. Tunis.
Archives of Internal Medicine. M. $5. American Medical Association, 535 N. Dearborn St., Chicago.
Archives Internationales de Laryngologie, Otologie, Rhinologie et Broncho-œsophagoscopie. M. 60 francs. Paris.
Archives des Maladies de l'Appareil Digestif et de la Nutrition. Monthly except August and September. 45 francs. Paris.
Archives des Maladies du Cœur, des Vaisseaux et du Sang. M. 36 francs. Paris.
Archives de Médecine des Enfants. M. 40 francs. Paris.
Archives de Médecine et de Pharmacie militaires. M. Paris.
Archives Médicales Belges. M. 30 francs. Brussels.
Archives of Neurology and Psychiatry. M. $8. American Medical Association, 535 N. Dearborn St., Chicago.
Archives of Occupational Therapy. Bi-m. $5. Williams & Wilkins Co., Baltimore.
Archives of Ophthalmology. Bi-m. $6. G. P. Putnam's Sons, 2 W. 45th St., New York.
Archives of Radiology and Electrotherapy: Continued as British Journal of Radiology.
Archives of Surgery. Bi-m. $8. American Medical Association, 535 N. Dearborn St., Chicago.
Archives Urologiques de la Clinique de Necker. Q. Paris.
Archivio Italiano di Chirurgia. 100 lire per vol. Bologna.
Archivio di Ostetricia e Ginecologia. M. 40 lire. Naples.
Archivio di Patologia e Clinica Medica. Bi-m. 85 lire. Bologna.
Archivos Brasileiros de Medicina. M. 30 milreis. Rio de Janeiro.
Archivos de Endocrinología y Nutrición. M. 25 pesetas. Madrid.
Archivos Españoles de Pediatría. M. 25 pesetas. Madrid.
Archivos del Hospital Rosales. San Salvador.
Archivos Latino-Americanos de Pediatria. M. $5. Buenos Aires.
Atlantic Medical Journal. M. $3. 230 State St., Harrisburg, Pa.
Australian Journal of Experimental Biology and Medical Science. Q. £1 1s. University of Adelaide, Australia.
Beiträge zur klinischen Chirurgie. Irregular. Price varies. Berlin.
Boston Medical and Surgical Journal. W. $6. 126 Massachusetts Ave., Boston.
Brain. A Journal of Neurology. Irregular. 24 shillings. London.
Bratislavské Lekárske Listy. M. 45 Kčs. Bratislava.
Brazil-Medico. W. $5. Rio de Janeiro.
Bristol Medico-Chirurgical Journal. Q. 10s. 6d. per year.
British Journal of Anæsthesia. Q. $10. Manchester.
British Journal of Children's Diseases. Q. $6. London.
British Journal of Dermatology and Syphilis. M. 2 guineas. London.
British Journal of Experimental Pathology. Bi-m. £2. London.
British Journal of Medical Psychology. Q. $7 net per volume. University of Chicago Press, 58th St. and Ellis Ave., Chicago.
British Journal of Ophthalmology. M. 2 guineas. London.
British Journal of Radiology. M. £2 2s. Paul B. Hoeber, Inc., 67-69 E. 59th St., New York.
British Journal of Surgery. Q. $10. 51 Fifth Ave., New York.
British Journal of Tuberculosis. Q. $2.50 per year. G. E. Stechert & Co., 31-33 East 10th St., New York.
British Medical Journal. W. 1 shilling 3 d. per issue. London.
Bruxelles Medical. W. 35 francs. Brussels.
Bulletin de l'Académie de Médecine. W. 40 francs. Paris.
Bulletin de l'Académie Royale de Médecine de Belgique. M. 30 francs per volume. Brussels.
Bulletin of the Johns Hopkins Hospital. M. $4. Baltimore.
Bulletin of the Lying-In Hospital, New York. Irregular. $1. Bulletin of Lying-In Hospital Press, New York.
Bulletin Médical. Semi-w. 25 francs. Paris.
Bulletin of the Porto Rico Medical Association. Irreg. $3 per year. San Juan, Porto Rico.
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Acad.—Academy
A.—Association
Am.—American
Coll.—College
Conf.—Conference
Cong.—Congress
Conv.—Convention
Dist.—District
Hosp.—Hospital
Internat.—International
M.—Medical or Medicine
Nat.—National
Phar.—Pharmaceutical
Phys.—Physicians
Ry.—Railway
S.—Society
Surg.—Surgical or Surgeon, Surgery

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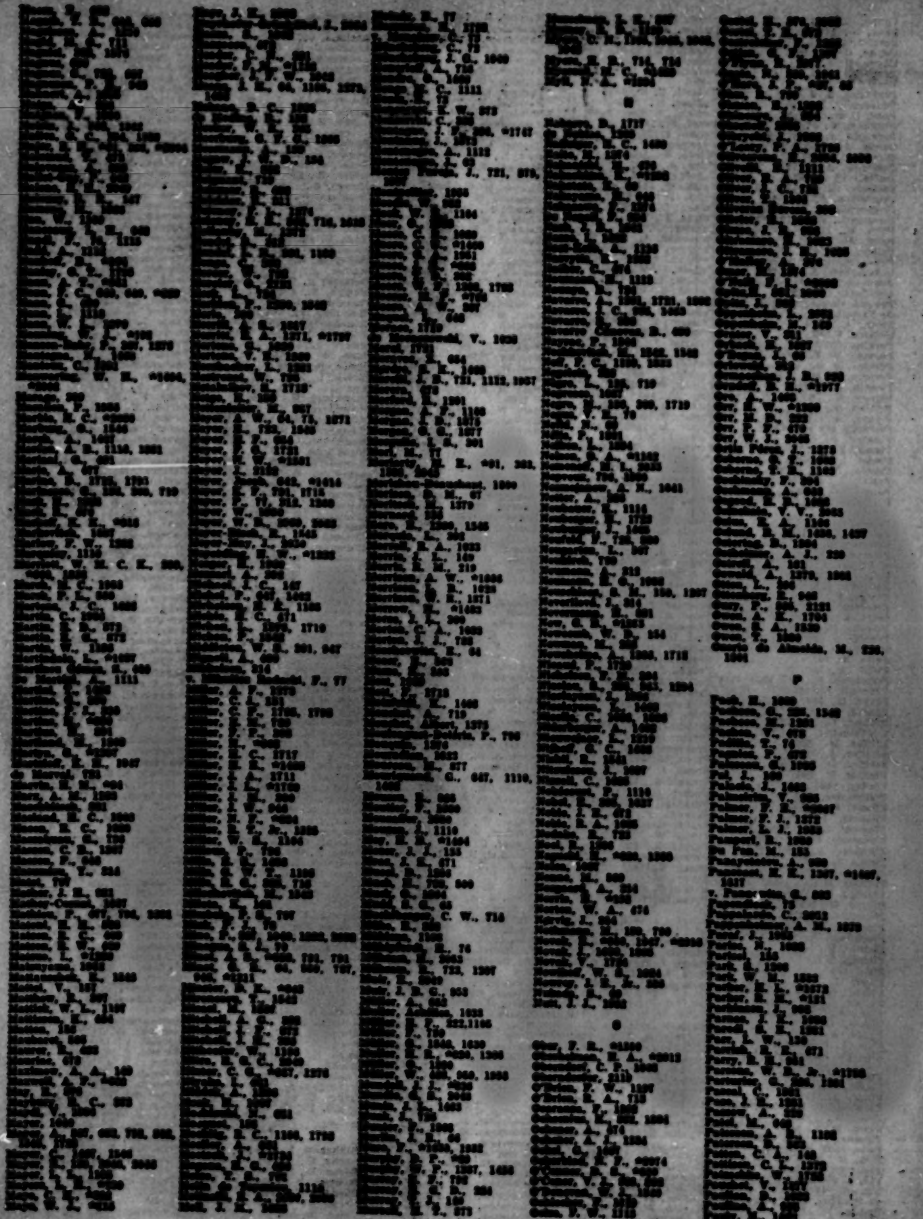

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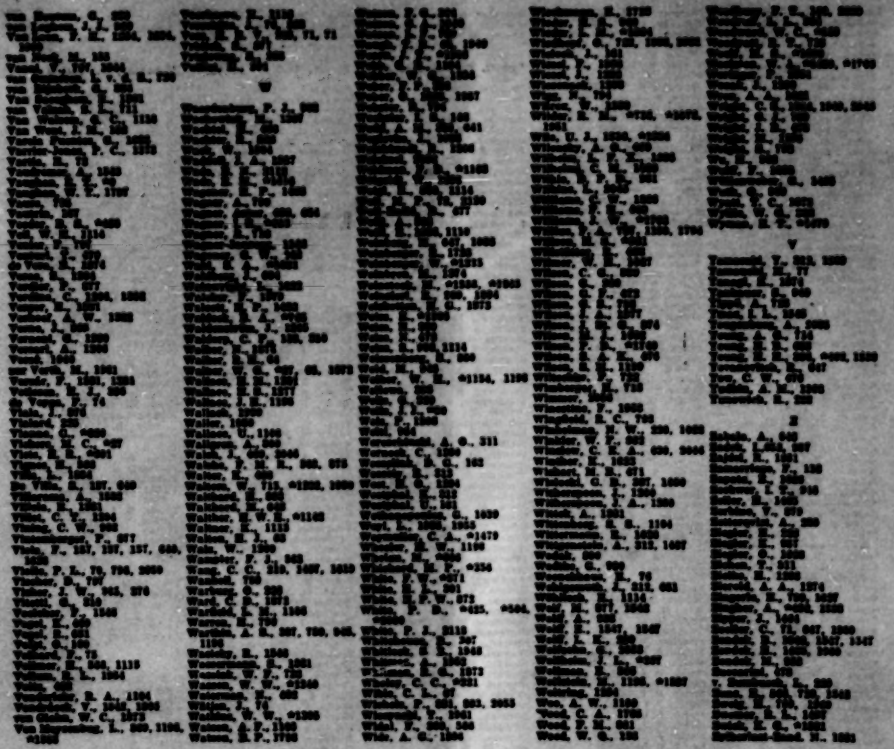

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